





Joannes B. Lowan
In Classe Historici
Discipulus
 INGENIO AC LABORE
Insignis.
 PREMIUM HOCCE

Merito Consecutus Est.
Apud Coll. Glasg.
Imo die Martii.
Joannes M. Raper
1850. *Edw. L. Raper*

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RESEARCHES

ON

OPERATIVE MIDWIFERY

ETC.

WITH PLATES.

BY FLEETWOOD CHURCHILL, M.D.

LICENTIATE OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS IN IRELAND—PHYSICIAN
TO THE WESTERN LYING-IN HOSPITAL, AND TO THE ADELAIDE GENERAL HOSPITAL—
LECTURER ON MIDWIFERY, AND DISEASES OF WOMEN AND CHILDREN, IN THE
RICHMOND HOSPITAL SCHOOL OF MEDICINE, ETC. ETC.

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TO

CHARLES JOHNSON, ESQ. M.D.

MASTER OF THE LYING-IN HOSPITAL, DUBLIN, PRESIDENT OF THE OBSTETRICAL SOCIETY
ETC. ETC.

AND TO THE

PRESIDENTS, HON. PRESIDENTS, VICE PRESIDENTS, AND MEMBERS OF
THE DUBLIN OBSTETRICAL SOCIETY,

THIS VOLUME OF ESSAYS

IS RESPECTFULLY DEDICATED.

TO

WILLIAM STOKES, ESQ. M. D. M.R.I.A.

FELLOW OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS—REGIUS PROFESSOR OF
MEDICINE IN THE UNIVERSITY OF DUBLIN,

THIS VOLUME

Is affectionately inscribed by his obliged friend,

THE AUTHOR.



PREFACE.

Most of these Essays have already appeared in different periodicals, and the very favorable manner in which they have been received has induced me to re-publish them, complete, in the present volume.

In the *Essays on Operative Midwifery*, I have endeavoured to give a correct chronological history of each operation, with all the statistics I can collect, and careful inductions from them, adding such ample practical conclusions as the records of midwifery, or my own experience, have furnished.

As I have given very copious references to the authors I have consulted, in the beginning of each Essay, I have not thought it necessary to repeat them minutely afterwards, although for the information there given I am equally indebted to those writers.

I do not wish to overrate the value of the Statistics. At the utmost they only afford an approximation to the truth, owing to the numerous drawbacks from their exactness—but nevertheless, I cannot doubt that they are of considerable value, and are, at least, available in pointing out the relative importance of each operation.

To complete the subject, I have added Plates of nearly all the varieties of the Vectis, Forceps, Perforator and Crotchet, hitherto used. I am indebted to the politeness of Drs. Conquest and Davis, and of Mr. Holmes, for permission to copy the engravings of some of their instruments; and I take this opportunity of expressing my thanks to them.

The *Essay on the Funis Umbilicalis* is inserted because of certain measurements which are of practical interest.

The *Report of the Western Lying-in Hospital* is simply a record of facts, which possesses a numerical value, and though not very extensive, it is, I believe, correct.

I have ventured to add to these a *Chronological Catalogue of British and Foreign Midwifery*, for the benefit of those who, like myself, regard the works of authors as the best history of their profession. Having experienced the want of such a list myself, I am led to hope it may be useful, though I cannot suppose that it is perfect. I shall thankfully receive any information which may render it more complete.

I am not unconscious of the defects of this work, but I have a keen and grateful sense of the kindness with which my former volumes have been received, and as I am not aware of having neglected any source of information, I again offer the results of my labors to the profession with confidence.

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ESSAY I.

ON THE ARTIFICIAL INDUCTION OF PREMATURE LABOR.

(*Accouchement prématuré artificielle. Accouchement provoqué. Fr. Die Künstliche Frühgeburt. Die Künstliche Wassersprengen. G.*)

THE induction of premature labor, for the purpose of saving the life of the infant, of its mother, or of both, though of comparatively modern origin, is an operation of great value in certain cases, and it is one of the few instances of an improved science augmenting the number of operations.

There would appear to be, in the minds of all men, a repugnance to interfere with the natural progress of those great phenomena which ordinarily run a definite and uniform course ; and in the present case this objection is increased, because the proposed interference is to remedy one irregularity by another.

Accordingly, the first consideration has always been, not the *usefulness*, but the *morality* of the operation. Dr. Denman states* that Dr. Kelly informed him, “ that about

* Introduction to Midwifery, p. 318, 7th ed.

the year 1756, there was a consultation of the most eminent men at that time in London, to consider the *moral rectitude* of, and the advantages which might be expected from, this practice, which met with their general approbation." The conclave decided in favor of the morality of such interference, and shortly afterwards the operation was successfully performed by Dr. Macauley. Subsequently, Dr. Kelly "practised it, and among other instances, he mentioned that he had performed this operation three times upon the same woman, and that twice the children had been born living."*

So numerous, and upon the whole, so successful have been the instances in which it has been tried since Denman's time, that it has taken its place among the regular obstetric operations in the various systems of British writers and teachers; and among its supporters may be found the distinguished names of Denman, John Clarke,† John and James Barlow, ‡ Burns, Hull,§ Merriman,|| Conquest,¶ Gooch,** Blundell,†† Hamilton,‡‡ Corry,§§ Ramsbotham,||| Ingleby,¶¶ Ashwell,*** &c. &c. Dr. Denman's remarks upon the propriety of the operation, as to morals, are so conclusive, that I may be excused if I quote them. "With regard to

* Introduction to Midwifery, p. 319.

† London Practice of Midwifery, p. 233, 6th Ed.

‡ Med. and Phys. Jour. vol. v. p. 40. Med. Facts and Observations, vol. viii.

§ Second Letter on the Cæsarian Section. Trans. of Bandelocque, p. 48.

|| Med. Chir. Trans. vol. iii. p. 127. Synopsis of Difficult Parturition, p. 179.

¶ Outlines of Midwifery, p. 135.

** Lectures reported by Skinnor, p. 221.

†† Principles and Practice of Obstetrics, p. 559.

‡‡ Practical Observations, Part II. p. 173.

§§ Med. Gaz. Oct. 21, 1837.

||| Med. Gaz. June 15, 1839, p. 420.

¶¶ Facts and Cases in Obstetric Medicine.

*** Guy's Hospital Reports, No. II.

the morality of the practice, the principle being commendable—that of making an effort to preserve the life of a child, which must otherwise be lost, and nothing being done in the operation which could be injurious or dangerous to the mother, but on the contrary, a probability of lessening both her danger and suffering—I apprehend, if there be a reasonable prospect of success, no argument can be adduced against it, which will not apply with equal force against any kind of assistance at the time of parturition; against inoculation, or medicine in general; and in fact, against the interposition of human reason and faculties in all the affairs of life.”*

In France, however, the proposed operation was by no means so frankly received, or so readily adopted. Certain doctrines of the national church, or at least the interpretation of them by the Doctors of the Sorbonne, touching the importance of foetal life, seem to have aggravated the risk of the operation, and to have deterred professional men from making the attempt. The great name and extended influence of Baudelocque† were opposed to what he considered (in the case supposed) a crime; and a celebrated teacher of the present day, Capuron,‡ has stigmatized it as “*un attentat commis envers les lois divines et humaines.*” Even so late as 1827, on the occasion of a memoir presented by M. Coste, demanding if it would be allowable to bring on labor prematurely in females labouring under aneurism of the heart, the Academie Royale de Medicine pronounced the question “*inconvenient et presque immoral.*”§ It is said, however, by M. Sue,|| that M. Petit ranged himself on the side of the advocates of

* Introduction to Midwifery, p. 319.

† De l'Art des Accouchemens, vol. ii. p. 285.

‡ Cours Theorique et Pratique sur les Accouchemens, p. 538.

§ Marinus on Induction of Premature Labor, in Bulletin Med. Belge, Sept. 1837.

|| Essais Historiques sur l'Art des Accouchemens, vol. i. p. 606.

the operation, and since then it has been recommended and practised by Stolz,* Ferniot, Paul Dubois,† Dezeimeris,‡ Burckhardt,§ Velpeau,|| Figueira,¶ Coste, &c.**

The objections of the French authors may be thus summed up :—

1. It is immoral. (*Sue, Capuron, Baudelocque.*)
2. It is almost impossible to determine the exact relations between the head of the child and the pelvis. (*Capuron, Baudelocque.*)
3. The manœuvres necessary for exciting labor are highly dangerous. (*Capuron.*)
4. The uncertainty of all women as to the period of their pregnancy. (*Baudelocque.*)
5. The difficulty of dilatation of the os uteri at the seventh month. (*Baudelocque.*)
6. The danger of subsequent disease.

Each of these objections will be answered as we proceed.

It is quite evident, as M. Marinus observes, that these writers had in view the “accouchement forcé,” performed at the seventh or eighth month—a different operation, and one perfectly unjustifiable at so early a period.

It has been recommended and practised in Germany by Weidmann,†† Mai, Siebold,‡‡ (four times), Schilling, (once), D'Outrepont, (twice), Riecke, (twice), Haase, (twice), Falco, (three times), Vezin, (three times), Mende, (four times),

* Mémoire présentée à l'Acad. Royale de Med. 1833.

† Thèse du Concours, pour la chair de l'Accouchement, 1834.

‡ Art. *Accouch. Prematurè*, Dict. de Med.

§ Essai sur l'Accouchement Premat. artif. Thèse, Strasburg, 1830.

|| Traité Complet de l'Art des Accouchemens.

¶ Etude de l'Accouchement Premat. artif. &c. Thèse soutenue à Montpellier, 1837.

** Revue Med. 1827.

†† Entwurf der Geburtshülfe, p. 250.

‡‡ Lehrbuch der Pratischen Entbindungskunde, &c. p. 329.

Betschler, Froriep, Wenzel,* Spiering,† Ritgen,‡ (thirty times), Carus,§ (twice), Kluge, (twenty times), Reisinger,|| Busch,¶ Naegelè, (once), Seulen,** (once), Neumann,†† (once), Spoendli,‡‡ (once), Hayn,§§ (once), Mampe,||| (five times), Rosshirt,¶¶ Kilian,*** (three times), &c. &c.; but opposed by Stein, Osiander, sen.††† Bernstein, Ebermaier, Gumprecht, Piringer, Joerg, &c.

In Italy it seems to have met with less opposition; or at any rate, less aversion has been expressed. Successful cases

* Ueber die künstliche Frühgeburt, p. 127.

† Die Pratische Geburtshülfe, p. 304.

‡ Die Anzeigen der Meeh. Hülfen bei Entbindungen, &c. p. 435.

§ Gynæcologie, vol. ii. p. 290.

|| Die Künstliche Frühgeburt.

¶ Lehrbuch der Entbindungskunst.

** Siebold's Journal, vol. viii. p. 673.

†† Ibid, vol. xiii. p. 257.

‡‡ Schmidt's Jahrbueher, June, 1839.

§§ Gazette Med. June, 1838.

||| Caspar's Woehenschrift, Jan. 1839.

¶¶ Die Anzeigen zu den Geburtshülfflichen Operationen, 1835, p. 38.

*** Die Operative Geburtshülfe, vol. ii. p. 289.

††† Osiander objects, 1st, that children at the 28th or 32d week, generally die at birth, or soon after, and that the calculation of pregnancy is very uncertain, rendering the induction of premature labor of no more value, in some cases, than perforation. 2d. That it is impossible, before labor, to say that the relative diameters of the fœtal head and the pelvis are such, that the fœtus cannot be transmitted at nine months. 3d. That the situation of the os uteri renders the operation difficult. 4th. That spasm of the orifice or neck of the womb may be an impediment. 5th. There is danger of wounding the soft parts of the mother. 6th. Or of injuring the presenting part of the child. 7th. Labor may not come on after evacuation of the liq. amnii. 8th. The child may be dead. 9th. Even if living, artificial assistance may be required to complete the delivery. 10th. When born alive, the child seldom lived. 11th. There is more danger of hæmorrhage than in ordinary labor.—*Handbuch der Entbindungskunst*, vol. ii. p. 241; vol. iii. p. 631.

have been published by MM. Ferrario,* Billi, Lovati,† Bongoianni, &c. &c.

Paul Scheel‡ in Denmark; Solomon de Leyden, and Professor Vrolik§ in Holland; and M. Marinus in Belgium, have each advocated the practice.

So much for the history of this operation, and the difficulties attendant upon its introduction into practice.

As to the origin of it, all writers are agreed in attributing it to the following circumstances:—It has not unfrequently happened that the life of a seven or eight months' child has been preserved by accidental premature labor, in cases where the birth of a child at the full term had been previously found impossible, from pelvic distortion.

From the complete success of such cases, as regards both mother and child, it was inferred that premature labor, artificially induced, might, in certain cases of pelvic deformity, be employed to supersede an operation (craniotomy) which involved not only the destruction of the child, but considerable risk to the mother. The proposal was not, it must be remembered, to deliver the fœtus artificially, but merely, as was stated by Ritgen,|| “to communicate a slight but certain impulse,” by virtue of which the process of parturition may be carried on and completed by the natural powers.

The reasoning of Dr. Denman appears to me conclusive, as

* Journal Compl. des Sciences Med. vol. xxxiv. p. 359.

† Annali Univ. di Medicina, Trans. by M. Ollivier, in Archives Gener. de Med. Jan. 1833.

‡ Diet. de Med, vol. i. Art. Accouch. Premat. (Dczeimeris.)

§ Siebold's Journal, vol. vii. p. 30.

|| In Gemeinsame deutsche Zeitschrift für Geburtshülfe.

to the “moral rectitude” of the operation : the next question therefore, is as to its *safety* to the child and the mother, confining ourselves for a moment to the consideration of the cases originally proposed to be benefited by the operation.

It is perfectly established, that a fœtus is “*viable*” at the completion of seven months of utero-gestation, and many instances are on record of children born at that period living to a good old age. M. Chaussier (of Dijon) and his wife, were both seven months’ children : his Majesty George III. was also a seven months’ child ; and M. Foderè relates the case of the wife of a judge, whose pregnancies always terminated at the seventh month. Examples of “*viable*” infants born at an earlier period, are likewise to be found ; but I beg to refer to the able work of my friend Dr. Montgomery for further details ; concluding from all the evidence we possess of the viability of seven months’ children, that premature labor, accidentally or artificially induced, at the completion of the seventh month, does not involve danger to the child from the immaturity of its growth merely.

As to the actual risk of labor to the fœtus, as ascertained by an estimate of facts, I may adduce the following testimony :

Of twelve cases mentioned by Denman, the majority of the children were saved.

Mr. Barlow* reports seventeen cases—six children were still-born, five died a few hours after birth, and six lived.

Of Dr. S. Merriman’s ten cases, four children were saved.

Dr. Merriman, jun. mentions forty-six cases—sixteen children lived, and all the mothers recovered.

Dr. Conquest says, that out of nearly one hundred cases, about half the children were born alive.†

* Med. Facts and Observations, vol. viii.

† Outlines of Midwifery, p. 136.

In Mr. Gregory's case, the child was born alive, but died subsequently.

In Dr. Collins' case, the child lived.

In Mr. Corry's and Dr. Paterson's cases, the infants were saved.*

Dr. Hamilton states that "previous to the 26th of January, 1836, the author brought on premature labor in twenty-one individuals, on account of defective apertures, viz. in fourteen, once; in one, twice; in three, thrice; in two, four times; and in one, ten times. Of the forty-five infants thus prematurely brought into the world, forty-one were born alive. The death of the four still-born can be readily accounted for." "In the practice of Mr. Moir, and Dr. John Moir, premature labor was induced twelve times on six women. Nine of the infants were born alive, and the cause of the death of the three still-born infants could not be attributed to the operation."†

Of Dr. F. Ramsbotham's sixty-two cases, thirty-three children were born alive, and twenty-three lived for a considerable time.‡

Dr. Lee saved twelve children in thirty-one cases;§ in several of which, the crotchet was necessary after labor had been induced.

The child lived in Mr. Heane's|| and M. Spoendli's cases.¶

M. Ferrario saved five children out of six—M. Klugè 9 out of 12—M. Salomon 3½ out of 6½—M. Burckhardt 35

* Corry's Paper, *Med. Gaz.* Oct. 21, 1837. Ibid. Sept. 8, 1838.

† *Practical Observations*, Part II. pp. 180—182.

‡ *Med. Gazette*, June 15, 1839.

§ Ibid, Sept. 28, Oct. 5 and 12, 1839.

|| *Med. Gaz.* Jan. 26, 1839.

¶ Schmidt's *Jahrbucher*, &c. vol. xix. p. 58.

out of 52—M. Siebold 2 out of 3—M. Mampe 4 out of 5—the fifth being a shoulder presentation.*

Dr. Shippan, in his Inaugural Thesis, presented to the Medical faculty at Wurtzburg in 1831, has given a summary of 90 cases—73 children were born alive, but 18 of them died subsequently.†

According to MM. Velpeau and Kilian, 115 children were saved out of 161 cases.

M. Figueira collected 280 cases from different sources, in which 166 children were saved.

We may conclude from these different data, that more than half the children were saved, notwithstanding a cause of failure to which I have not yet referred. I allude to the greater frequency of mal-presentations in premature labor, than in labor at the full time.‡ In Dr. S. Merriman's cases, for example, there were eighteen mal-presentations out of the forty-six, only one of which was saved. If we could subtract all the cases of mal-presentations, we should find, I doubt not, that the proportion of children lost, to those saved by the operation, was very much smaller.

There is unquestionably *some risk* incurred by the mother, but not more than by an accidental premature labor. After much consideration, Denman concludes that “it is perfectly safe to the person on whom it is performed.”§

We have already seen that Dr. Kelly performed it three times successfully on one person.

Dr. S. Merriman seems to think that its safety was rather overrated, but he adds, “at all events, the method in question, if carefully conducted, cannot be more hazardous to the mother, perhaps is much less so, than the operation for

* Caspar's Wochenschrift, 1838, No. 41.

† American Journ. of Med. Science, Feb. 1, 1835.

‡ Blundell's Principles and Practice of Obstetricy, p. 561.

§ Introduction to Midwifery, p. 319.

lessening the head of the fœtus in utero, and it is incomparably less perilous than the Cæsarian operation, or the division of the symphysis pubis.”* Out of his 46 cases, not one proved fatal !

Dr. Hamilton observes, “ the late Dr. Merriman first called in question the safety of the operation, but the cases on which he formed his doubts on this point, were evidently cases of accidental coincidence, for the safety of the practice is now fully established.”†

Dr. Blundell concludes his observations by saying, that “ with all its faults about it, the practice is of great value, and there are now living in society, individuals whose heads have, in this manner, been preserved from the perforator.”‡

In Mr. Corry’s case, the woman recovered rapidly.§

Dr. Gregory and Dr. Collins each operated once, with safety to the mothers.

Dr. F. H. Ramsbotham has had recourse to this operation 62 times, and it does not appear that the mother suffered in any of them.||

Dr. R. Lee lost three mothers out of 31 cases.¶

Mr. Heane saved the mother.**

The statistical details given by Velpeau and Figueira, would justify, I think, a much more unqualified commendation. Velpeau states that it has been performed

In Great Britain	.	.	.	72 times.
In Germany	.	.	.	79 „
In Italy	.	.	.	7 „
In Holland	.	.	.	3 „

* Med. Chir. Trans. vol. v. p. 134.

† Practical Observations, Part II. p. 174.

‡ Principles and Practice of Obstetricy, p. 161.

§ Med. Gaz. Oct. 21, 1837.

|| Ibid, June 15, 1839.

¶ Ibid, Sept. 28, Oct. 5 and 12, 1839.

** Ibid, Jan. 26, 1839.

Making a total of 161 cases, of which number, eight mothers died, five of them, however, from causes unconnected with parturition.

M. Figueira has collected 280 cases, of which only six mothers died.

M. Salomon operated sixty-seven times, M. Kluge,* twelve, and M. Ferrario six times, successfully.†

M. Reisinger lost one patient in fourteen.‡

All M. Mampe's patients recovered.§

MM. Spoendli's|| and Seulen's¶ patients recovered well.

Of the ninety cases collected by Dr. Shippan, seven mothers died. In three of these the operation was performed once ; in two, twice ; and in one, three times.**

We may therefore conclude, with M. Marinus, that "if these facts be true, it is established, that females undergoing this operation incur no immediate danger, and if we push our researches still farther, we shall find that these same females were not attacked by pure lesions of the uterus, as has been advanced ; several of them underwent the operation two or three times, with as much safety as if they had been delivered at the full term of utero-gestation."††

Thus the first, third, fifth, and sixth objections made by the French are answered satisfactorily.

We have now only to inquire as to the *utility* of the

* Siebold's Journal, vol. ii. p. 233.

† Journ. Compl. des Sciences Med. vol. xxxiv. p. 339. Corry, Med. Gaz. Oct. 21, 1837.

‡ Dict. de Med. 2nd Ed. vol. i. p. 429.

§ Caspar's Wochenschrift, 1838, No. 41.

|| Schmidt's Jahrbucher, vol. xix. p. 58.

¶ Siebold's Journal, vol. viii. p. 673.

** American Journ. of Med. Science, Feb. 1, 1835.

†† Bulletin Med. Belge, Sept. 1837, p. 1.

operation, before considering the cases to which it is applicable.

The *positive* utility of the operation has already appeared in the numerical results taken from different authors, showing that more than one half of the children (all of whom must otherwise have been lost) have been saved, and that but a small proportion of the mothers have been lost.

The *comparative* utility is equally in favor of the operation.

It is peculiar to midwifery operations, that they form ascending series, increasing in gravity from the simplest to the most severe—no two being equal ; and therefore, in considering the suitability or practicability of any one, we do so with the knowledge that if the one we prefer does not succeed, we must have recourse to another more severe and more dangerous. An example will make my meaning clear. If, in any given case, we attempt to deliver with the forceps, but are not able to succeed, we must subsequently have recourse to the perforator ; there is no other method, of *only equal* severity with the forceps, which we can try. Or again, if craniotomy and evisceration will not render the transit of the child possible, we have no resource but symphyseotomy or Cæsarean section.

Thus, the *alternative* of any operation in midwifery is not one of *less*, or even of *equal* danger, but *necessarily* one of a *more serious nature*, and consequently we cannot estimate the utility of any obstetric operation fairly, if we consider it by itself ; a just appreciation involves a due estimate of its alternatives.

It is to the *alternatives* of the induction of premature labor, that I would wish to call attention, as demonstrating very strikingly the *comparative utility* of the practice.

In the cases which have been supposed to demand this operation, there is always a considerable diminution in the

calibre of the pelvis from bony distortion, so that it would be quite useless, at the full term of utero-gestation, to attempt the delivery by the forceps; the only *alternatives*, therefore, if we allow pregnancy to be completed, are, the perforator, symphyseotomy, and the Cæsarean section.

Now let us compare the mortality attendant upon each of these operations with the results of artificial premature labor.

1. By the use of the *perforator*, not only are all the children destroyed, but extensive statistics have shown, that about one in five of the mothers perish, either from the direct effects of the operation, or from the length of the previous labor.

2. *Cæsarean section* is the “*dernier ressort*” of midwifery, involving the utmost danger to the mother and child, and justifiable only when no other chance for either remains. I have collected 405 cases; 230 mothers were saved, and 175 lost—or about 1 in $2\frac{1}{3}$. Of 221 children, 156 were saved, and 65 lost—or about 1 in $3\frac{1}{2}$.

3. *Symphyseotomy* is attended with worse results than Cæsarean section. One-third of the mothers have been lost, and many of those who recovered, suffered severely from the consequences of the operation. One-half of the children were lost.

If then to the *absolute* advantages of the operation proposed, be added the *comparative* gain from avoiding these terrible *alternative* operations, we may form a tolerably correct estimate of the *utility* of the “induction of premature labor.”

Having, as I trust, established from facts and testimony, the three leading principles of the *morality*, *safety*, and *utility* of this operation, I shall now proceed to inquire as to the *cases in which it is available*.

1. The class of cases, for which it was first proposed, and in which it has been most frequently employed, is that in which the diameters of the upper outlet of the pelvis are too much reduced by distortion to permit the passage of a fœtus at the full term, and yet not so much diminished as to prohibit the passage of a fœtus at an earlier but still “*viabile*” age. In the words of Denman, “it is under circumstances and in situations preventing the successful use of the vectis or forceps, and just compelling us to the fatal measure of lessening the head of the child, that it may be a duty to propose on a future occasion the bringing on of premature labor.”*

The first step is to endeavour to ascertain the size of the fœtal head at different periods of utero-gestation, after the seventh month; in order, that by adapting the diameters of the deformed pelvis to the appropriate diameters of the fœtal cranium, we may be enabled to fix upon the moment when they are in correspondence for the induction of premature

* The following very interesting case of the induction of premature labor by M. Dubois, in a female of dwarf stature, I copy from the *Lancet* of March 28, 1840:—“The subject of this case was a girl 23 years of age, and in stature, 3 feet 2 inches—scarcely that of a child five years of age.” “She became pregnant, and at the time of labor it was necessary to lessen the head of the child, from want of space in the pelvis. Last year she again became pregnant, and immediately announced the fact, as she had been desired, to M. Dubois. In February she had arrived at the eighth month of pregnancy. M. Dubois now decided on effecting a premature delivery. The patient was first placed in a warm bath: a speculum was introduced, and a piece of conical sponge passed into the neck of the uterus; at the same time, six grains of the *Secale Cornutum* were administered. After a lapse of four hours, the patient experienced strong pains, and labor was fully established. At 9 o’clock the membranes were ruptured, and it was discovered that the breech presented; some slight difficulty was found in withdrawing the head, but this was soon overcome, and the delivery happily completed. The child was small, but living; the bi-parietal diameter 3 inches; the occipito-parietal $3\frac{1}{6}$ inches; the length of the child, 15 inches. It weighed only 3lbs. 12 oz. The mother gave it milk for the first few days, and within a short time both parent and child were perfectly well.”—*Gazette Medicale*, No. 11, 1840.

labor. It is of course impossible to do this in any individual case,* but an approximation may be attempted, by taking the measurements in a considerable number of cases, at the same periods.

The following table has been thus constructed by M. Figueira.

Age of Fœtus.	Bi-parietal Diameter.	Occipito-frontal Diameter.	Occipito-bregmatic Diameter.
7th Month.	2 in. 9 lines.	3 in. 8 lines.	2 in. 10 lines.
7½ "	3 "	3 " 9 "	3 "
8th "	3 " 1 "	3 " 10 "	3 " 1 "
8½ "	3 " 2 "	4 "	3 " 2 "
9th "	3 " 4 "	4 "	3 " 4 "

To this kind of calculation it has been objected, that we cannot be quite sure of the exact age of the fœtuses measured: and to the practical use of it, that the female cannot be quite sure of the exact period of pregnancy. (*Baudelocque, Oslander.*) That this objection has a certain weight, must be admitted; but that it is sufficient to prohibit the operation I cannot believe, for it may always be obviated in practice *by assuming the longest possible period of pregnancy.* If, for example, a patient imagine that she is six months pregnant, but that she may be six and a half; by calculating for the six and a half months, we shall have assumed the largest size to which the fœtal head can have attained; and if labor be not brought on till seven months and a half, we shall also have secured a fœtus of the "*viable*" age.

Ritgen has made another series of calculations, which have led to the following practical adaptations:

* " D'abord, comment s'assurer de l'époque où il faut provoquer l'accouchement prématuré, puisque la tête étant incommensurable dans la matrice, il est impossible d'en assigner, le rapport avec le bassin ?"—*Capuron, Cours Théorique et Pratique sur l'Accouchement*, p. 538.

He says that labor may be induced at the

29th week, when the antero-posterior diameter of the pelvis is 2 in. 7 lines			
30th	"	"	2 ... 8 ...
31st	"	"	2 ... 9 ...
35th	"	"	2 ... 10 ...
36th	"	"	2 ... 11 ...
37th	"	"	3 ... 0 ...

There is a very slight difference between the tables of Figueira and Ritgen, which may be allowed for in practice. The compression of the foetal head will also render its diameter less than the subsequent measurement would lead us to suppose.

It will be at once observed, that there are two measurements of the pelvis which limit the operation ; if the pelvis exceed the greater measurement, the operation is uncalled for ; and if less than the least, it will not succeed in saving the child.

The smallest of these diameters appears to be about two and a half inches, and the greater three and a quarter. If the pelvis, in its sacro-pubic diameter, be less than the former, a "*viable*" child will not pass, and it is generally admitted that a living child may be propelled through a pelvis whose antero-posterior diameter is three and a half inches.

The opinions of different authors accord with this calculation. Dr. John Clarke says " that the time may be bounded on one side by seven months, and on the other by eight and a half." " When the distance between the pubes and sacrum is under three, yet all but three inches, eight months may be allowed ; when the distance is two and three quarters, seven months ; and so on."*

Mr. James Barlow† observes, " I presume then, that a pelvis, the small diameter of which measures, from pubis to sacrum, about two inches, or two and a half inches, appears

* London Practice of Midwifery, p. 235.

† Medical and Physical Journal, vol. v. p. 46.

to favour the success of this operation more than any other dimensions.”

Dr. Gooch* recommends us “to reckon seven calendar months and one week from the last menstrual discharge, and then bring on premature labor.”

Dr. Blundell† names seven months and a fortnight, if our object be to save the child.

“With great confidence, therefore, the author can recommend this practice in all cases where the deficiency of space in the apertures of the pelvis does not fall under two inches and a half.” (*Hamilton‡.*)

M. Figueira observes that “every time that the sacro-pubic diameter is from $2\frac{1}{2}$ to $3\frac{1}{4}$ inches, premature delivery is indicated from 7 to $8\frac{1}{2}$ months.”

M. Marinus advocates the end of the seventh month, when the pelvis is $2\frac{1}{2}$ inches in its sacro-pubic diameter.

M. Busch fixes upon $2\frac{3}{4}$ inches as the medium diameter, and the twenty-eighth week as the best period for the operation.

Another difficulty still remains, which has been put forward as a very serious objection by the opponents of this operation; and this is the uncertainty of ascertaining the exact diameters of the pelvis in the living subject. Various mechanical contrivances have been proposed by Aitken, Coutouly, Baudelocque, Asdrubali, Chaussier, and others, (pelvimeters as they are called,) into the merits of which I do not propose to enter at present; it is sufficient to say, that in this country they could rarely if ever be employed. Nor do I think them necessary; a well practised finger is, after all, the best pelvimeter, and will yield sufficiently accurate information.

* Lectures edited by Mr. Skinner, p. 222.

† Principles and Practice of Obstetrics, p. 560.

‡ Practical Observations, Part II. p. 183.

But giving the utmost force to this objection, to what does it amount? As Velpeau justly observes: "If the pelvis be wider than we thought, premature delivery (at or after the seventh month) is accomplished without risk. If, on the contrary, the narrowing be more considerable, the fœtus will certainly perish; but then had no operation been attempted until the full term, the fœtus would equally have been lost, and the mother would have run greater risk."

Besides, much information may be derived from the history of the previous labors of the patient, for it is rarely if ever for the first child that the induction of premature labor is proposed.

Dr. Merriman* remarks, "that the use of the perforator in a former labor, is not *alone* to be considered as a justification of this operation." This is undoubtedly true in the present uncertain state of opinion, concerning the use of the forceps and crotchet, inasmuch as the latter instrument is frequently used where there is no distortion.

But if we are convinced that the perforator was used from the impossibility of otherwise delivering the patient, it might then be an adequate reason, and if it further appeared that her labor had been thus terminated more than once, and for the same reason, the operation would then seem to be imperatively required. (*Blundell.*†)

I have now answered all the six objections put forward by the French, as fairly and completely as our facts permit.

2. *A narrowing of the transverse diameter of the lower outlet*, as it offers a fixed impediment to parturition, may be an equally valid ground for the induction of premature labor. (*Denman.*‡)

* Synopsis of Difficult Parturition, p. 183, *fourth edition*.

† Principles and Practice of Obstetrics, p. 559.

‡ Introduction to Midwifery, p. 321.

3. *Exostosis, or fibrous tumors of the pelvis*, as they offer an impediment to the delivery of a child at term, or even at the earliest viable age, and as they are solid, and cannot be removed by any operation, will evidently justify the induction of premature labor, or abortion, for the purpose of avoiding the Cæsarean section.*

Some of the cases related by Dr. Merriman would appear to confirm this conclusion, and the authority of Dr. Ashwell and his practice are in favor of it.†

Mr. Ingleby concludes that “premature labor may with great propriety be proposed on pregnancy recurring, assuming the delivery of a living child at term to have already proved impracticable, the tumor to remain unchanged, and its excision not deemed expedient.”‡

4. When the *uterus* is the seat of *fibrous tumors*, and impregnation takes place, certain morbid changes occur, involving danger to the mother. “The tumors soften during the latter months; the increased vascular supply leads to inflammation; unhealthy and imperfect suppuration is established in them, and death occurs soon after parturition.” This being the experience of Dr. Ashwell, he has proposed “the induction of premature labor, *before that period, when the tumors shall be subjected to pressure and contusion, from the firm, large, and unyielding gravid uterus.*”

Before we act upon this suggestion, however, we must be pretty certain that such pressure is likely to take place, and that the case really demands so serious a remedy. Mr. Ingleby has some valuable observations on this subject.§

* See Dr. Montgomery's Case, Dublin Journal, vol. vi. p. 418.

† Guy's Hospital Reports, No. II. p. 300.

‡ Facts and Cases, &c. p. 149.

§ Facts and Cases, &c. p. 153.

5. In the cases I have supposed, the safety of the child is the great object of the operation, and they are limited, therefore, to those patients in whom the pelvis, though deformed, is still large enough to permit the passage of a “*viable*” child. But there are cases where *the distortion is so great as to render the passage of a seven-months child impossible*, and others still worse, where *no reduction of the child’s bulk will enable it to pass*.

I do not see why abortion should not be induced at an early period in such cases. The life of the child must inevitably be sacrificed, and the safety of the mother alone regarded; and surely, after the calculations I have adduced,* it cannot be pretended that Cæsarean section, the *alternative* in these cases, offers such a chance to the mother and child as would justify our preferring it.†

“When the pelvis is known to be distorted,” says Dr. Aitken, “so as to render the birth of a living child impossible, is it not lawful and proper, to prevent the dangers of embryotomy, to induce early abortion.”‡

An objection to this extension of the operation has been made by Dr. Merriman and others, on the score that it would be “opening a wide door to the dreadful abuse of the operation.” That, in short, by multiplying the examples of inducing premature labor or abortion, we should run the risk

* See page 13.

† Mr. Barlow (Med. and Phys. Jour. vol. v. p. 51,) states a curious question on this point, “as to how far the morality of the practice may be justifiable, when performed with the view of preserving the life of the mother and sacrificing that of the fœtus.” “In such a situation is the accoucheur excusable, who tacitly complies with the request of the mother, and voluntarily sacrifices a number of immature fœtuses, with a view to her own preservation?” In other words, Mr. Barlow thinks that if the woman go on conceiving, and we operating, the *value* of the fœtuses destroyed may at length equal that of the mother’s life.

‡ Principles of Midwifery, p. 83.

of its being performed unnecessarily, or for wicked purposes. But so may the fact of its being performed at all, and so may the practice of using ergot of rye for the purpose of exciting uterine contractions. I do not, in truth, see much force in this objection, nor do I anticipate any such prostitution of their power on the part of the members of our profession; and beyond the profession, the operation is not likely to be much known. It will of course be necessary that the case be thoroughly investigated by more than one person, and the time appropriately chosen.

Mr. Radford, of Manchester, has suggested that by combining craniotomy with the induction of premature labor, in those cases where we are called too late for the fœtus to pass even at an early period, we may avoid the Cæsarean operation.

6. In certain cases of *rupture of the uterus*, the cause is almost entirely mechanical. There is some narrowing of the upper outlet, perhaps a projection of the promontory of the sacrum, offering an obstacle to the ready descent of the fœtal head, which is driven forward with great force by the uterine contractions. Under such circumstances, the head may be pushed to one side, and if the tissues be not very firm, it will be driven through them into the cavity of the peritoneum. Recovery from such an accident is very rare, but nevertheless, it has occurred, and if the woman become pregnant subsequently, a premature delivery may save both mother and child.

As the best argument I can employ in favour of this operation in such cases, I may mention that it was adopted successfully by the late distinguished Master of the Great Britain-street Lying-in Hospital, (Dr. Collins.) The patient had recovered from rupture of the uterus, and became

again pregnant. She was admitted into the hospital in the seventh month of pregnancy, and the membranes were ruptured on the 4th of March, 1832. Labor came on on the 7th, and was completed in 10 hours. The patient was delivered of a living child, and recovered. The child, however, lived but two days. The case is perfectly illustrative of the advantages which may be derived from the operation in this class of cases. The mother was saved, and the child at birth appeared likely to live; its death does not seem to have resulted either from its early age, or from the labor.*

7. Dr. Denman† observes, “there is another situation in which I have proposed and tried with success, the method of bringing on premature labor. Some women who readily conceive, proceed regularly in their pregnancy till they approach their full period, when, without any apparently adequate cause, they have been repeatedly seized with rigor, and the child has instantly died, though it may not have been expelled for some weeks afterwards. In two cases of this kind I have proposed to bring on premature labor when I was certain the child was living, and have succeeded in preserving the children without hazard to the mothers. There is always something of doubt in these cases, whether the child might not have been preserved without the operation; but as such cases often come under consideration, and as I am disclosing all that my experience has taught me, it seemed necessary to mention this circumstance.” Mr. Barlow‡ thinks the “doubt” expressed in the above extract, a sufficient ground for negating the operation.

* The patient was afterwards delivered naturally at the full time. The details of the case will be found in Dr. Collins’s “Practical Midwifery,” p. 255.

† Introduction to Midwifery, p. 321.

‡ Med. and Phys. Journal, vol. v. p. 52.

Mai and D'Outrepont agree with Denman.

Hayn, of Königsberg, succeeded in saving the child under these circumstances.*

8. The question has been mooted, whether it would be right to induce premature labor on account of the presence of *certain diseases caused by, or connected with pregnancy*. Denman remarks: "The propriety of this practice has also been considered when women have, during pregnancy, suffered more than common degrees of irritation, and especially when the stomach is in such a state, that it cannot bear nourishment of any kind or in any quantity, and the patients are thereby reduced to a state of dangerous weakness. Presuming that these symptoms are purely in consequence of pregnancy, it may, perhaps, be justifiable to bring on premature labor."

D'Outrepont advocates this procedure.

Dr. Merriman relates a case occurring in the practice of a "provincial surgeon of considerable eminence." "She was teased with a very severe cough, and her stomach was so irritable as to retain no food whatsoever, nor even opium in a solid form. She had taken absorbents, stomachics, bitters, aromatics, and opiates, without experiencing any relief: liniments, fomentations, and blisters, had been extensively applied without benefit, and she was thought to be sinking into her grave, when it was proposed, as a last resource, to bring on premature labor, six weeks before the full time, and the patient was delivered of a living child, and ultimately recovered."†

* Med. Gaz. June, 1838.

† Med. Chir. Trans. vol. x.

A case of fatal vomiting, during pregnancy, is related by Dr. Johnson in the Lancet, March 3, 1838, p. 825. "A lady, 30 years of age, soon

Dr. Davis has recorded three successful cases;* Dr. Burns witnessed it twice in the same patient,† and Drs. Ashwell‡ and Blundell§ are in favor of the practice.

D'Outrepoint, Carus, and Busch speak of the propriety of the operation in certain cases of *convulsions*.

Reisinger, Carus, Busch, in cases of *metrorrhagia*.||

Lyne and Hunter in *retroversio uteri*.

D'Outrepoint,¶ in *consumption*, where the patient is not likely to go the full time.

M. Coste has recommended it in *diseases of the heart*.**

In a report of the Berlin Lying-in Hospital,†† I find a reference made to its performance in cases of *rheumatism of the uterus*.

It sometimes happens, that the *serous effusion* which is usually confined to the lower extremities of pregnant females,

after marriage ceased to menstruate, and became affected with morning sickness, which symptoms were naturally enough attributed to pregnancy. The sickness, however, gradually became worse, and at last nothing of any kind could be retained on the stomach. Pregnancy was not detected, but the disorder attributed to some disease of the pylorus. The sickness and *extremo emaciation* were the only symptoms present. After death, no morbid appearances were observable in any part of the body. The uterus contained a *fœtus* about four months old. This patient was literally starved to death." "The treatment pursued consisted in the use of various salines, anti-emetics, counter-irritation, leeches, acetate of morphia sprinkled over a blistered surface," &c.

Surely the induction of premature labor in this case would have been justifiable, as affording the mother a chance of recovery.

For similar cases, see Davis's *Obstetric Med.* vol. ii. p. 871.; *Med. Chir. Review*, vol. viii. p. 149, New Series.

* *Obstetric Medicine*, vol. ii. p. 871.

† *Midwifery*, p. 254.

‡ *On Parturition*, p. 194.

§ *Prin. and Pract. of Obstetricy*, p. 181.

|| *Lehrbuch der Geburtskunde*, p. 538.

¶ Kilian, *Die Operative Geburtshülfe*, vol. i. p. 321.

** *Revue Med.* 1827, vol. i. p. 343.

†† *Lancet* for Jan. 27, 1838.

is extended to the cavities of the pleura and peritoneum, and as it thus gives rise to a train of severe and perhaps dangerous symptoms, the induction of premature labor may be advisable in some cases, (*Blundell*,)* and has been practised by Siebold† and Carus.

Puzos induced premature labor in a case of *strangulated hernia*, to facilitate the operation, and afford a better chance to the child.‡ He saved the child, but the mother died afterwards.

On this part of the question, I confess it appears to me almost impossible to lay down definite and general rules; the decision must rest with the judgment of the medical attendants in each individual case.

9. The only exception made by Baudelocque to his condemnation of artificial premature labor, is in those cases of great uterine hæmorrhage, before the completion of the term of utero-gestation, when the child is probably destroyed, and the safety of the mother compromised.§

These are all the circumstances which have ever been considered to justify our interference in the manner proposed.

Mode of operating.—Five methods of exciting uterine contractions have been adopted and recommended by different practitioners.

1. Abdominal frictions, and manipulation, with warm baths, &c. have been advised, but they very rarely succeed,

* *Obstetricy*, p. 185.

† Kilian, *Die Operative Geburtshülfe*, vol. i. p. 380.

‡ *Traité des Accouch.* p. 81.

§ *L'Art des Accouchemens*, vol. ii. p. 288.

their supposed advantage being the absence of unnecessary irritation.

2. Separating the membranes for two or three inches around the os uteri, will frequently bring on labor; and as this is the closest imitation of natural labor, it has been preferred by many. Dr. Hamilton* remarks, "that he is now convinced, from the experience of the last ten years, that if there be a sufficient portion of the decidua separated from the cervix uteri, there is no occasion for the introduction of the open male catheter," i. e. for puncturing the membranes. Dr. Conquest considers it as effectual as the other methods, and much safer for the infant, as saving it from pressure during the pains. If it fail, we can still have recourse to the third plan.

3. The membranes may be ruptured, either directly or obliquely. For this purpose Wenzel, Ritgen, Klugè, and others, have invented appropriate instruments; but a female catheter may be used, or a piece of wire, or a canula having concealed within it a spring trocar. (*Waller.*)† Care must be taken to wound neither the mother nor child.

This plan was adopted in Mampe's and Spöndli's cases; in 36 of Dr. F. H. Ramsbotham's—(of these 21 children were born alive, and 19 ultimately lived);‡ and from its greater certainty, it has been preferred by most practitioners.

4. MM. Brünninghausen and Klugè have proposed and practised, with great success, the dilatation of the os uteri, by

* Practical Observations, part ii. p. 180.

† See Denman's Introduction, p. 322, *note*.

‡ Med. Gaz. June 15, 1839.

means of a piece of sponge placed within it, and maintained there by a plug in the vagina. Velpeau's experience of the value of these different plans is thus expressed: "The two latter methods are chiefly practised. By the third, the effect is not always produced; it required three operations in the case related by M. Riecke. The separation of the membranes (the second method) is not sufficient to bring on uterine contractions; as the distension of the cervix is not permanent, the first attempt is rarely successful. Distension, by means of a piece of sponge, as proposed by M. Klugè, is much more certain. The irritation which results is permanent, progressive, regular, and sustained by the plug which is maintained in the vagina. Under the influence of such an excitement, uterine action is soon brought on, and it rarely fails to acquire sufficient energy.*

Hayn, of Königsberg, to whose case I have referred, adopted this plan with success; but other authors do not agree with Velpeau in thinking it more certain than rupturing the membranes.

5. Ergot of Rye is now pretty generally supposed to have the power of originating uterine contraction, and if this be the case, it will probably be found to be the most effectual and safe mode of inducing premature labor, because we can preserve to the child the safeguard of the liquor amnii, which is of the greatest importance.

Dr. F. H. Ramsbotham† has mentioned many cases in which it was tried for this purpose. Labor was brought on by its use alone, at the seventh or eighth month, in 26 cases, without interfering with the membranes of the os uteri. All

* *Traité Complet de l'Art des Accouchemens*, p. 440, Ed. Bruxelles.

† *Lectures in Med. Gazette* for 1834, vol. xiv. p. 85.

the mothers recovered, and 12 of the children were born alive, and 14 still-born. Of the 12 born alive, 4 only survived for any length of time.

Dr. Paterson of Glasgow, and Mr. Heane of Gloucester, succeeded by this means.*

Mr. Corry and Dr. Lee tried it and failed.†

Although the medicine appears successful as regards the induction of labor and the consequences to the mother, yet the proportion of children lost is greater than by the other methods; and this must be a serious objection to its use, when the pelvis will admit the passage of a viable child.‡

It has been suggested, that the application of the Extract of Belladonna might aid in the dilatation of the os uteri; but independent of the fact being doubtful, the practice would be dangerous, in consequence of the active absorption and the development of the poisonous effects of the medicine. Dr. Montgomery has mentioned to me some such cases, which came under his own observation, and others are on record.

An interval, varying from twenty-four to ninety-six hours, generally elapses after the operation, before uterine action commences, which it does sometimes by shivering and feverishness. "Great disturbance in the nervous system," says Dr. Gooch,§ "is produced by it; severe rigors, rapid pulse, and delirium, are the occasional consequences; but these symptoms, proceeding from nervous irritation, do not continue long enough to produce any serious consequences." In many cases, these symptoms are altogether absent. The patient will require the same management as after ordinary labor. It will be advisable to have a nurse in readiness, to

* Med. Gaz. Sept. 8, 1838. Ibid, Jan. 26, 1839.

† Med. Gaz. Oct. 21, 1837, p. 126. Ibid, Oct. 5, 1839.

‡ Ramsbotham, Med. Gaz. June 15, 1839.

§ Lectures by Skinner, p. 223.

supply the infant with its natural nourishment, until the mother shall have milk for it.

After the details I have given, I venture to offer the following conclusions :—

1. The induction of premature labor is not in itself immoral, and so far from being unsafe, or destitute of utility, but few of the mothers are lost, and more than half of the children are saved ; whilst in addition, both mother and child are spared the certainty of severe and dangerous operations.

2. That if the object be to save the life of the child, the cases to which it is applicable are those in which such a narrowing of the pelvis exists, as will prohibit the passage of a full grown fœtus, but not that of a younger, but still “ *viable*” one.

3. That with this view, the attempt will be useless, if the sacro-pubic diameter be less than two and a-half inches ; and superfluous, if that diameter be more than three and one-fourth inches.

4. That the operation should not be attempted before the completion of the seventh month, as that is about the period at which the child becomes “ *viable*,” but that it is well to allow an additional fortnight, to rectify any error in the calculation of the period of pregnancy.

5. That “ when this operation is had recourse to, and the dimensions of the pelvis are such as to promise success, we ought to defer the attempt as near to that period fixed by nature for the full evolution of the fœtus as circumstances will admit, that thereby the child may acquire every possible advantage to insure a healthy state of existence after birth.”
(*James Barlow.*)*

* Med. and Phys. Jour. vol. v. p. 47. Baudelocque, vol. ii. p. 288.

“ I have lying before me a list of premature births, in which the periods

6. "That the practice should never be adopted till experience has decidedly proved, that the mother is incapable of bearing a full grown fœtus alive." (*Merriman.*)*

7. That as a diminution of the transverse diameter of the lower outlet, or impediments arising from immovable morbid growths, may prove insurmountable obstacles to the delivery of a full grown fœtus, either may afford an adequate reason for the induction of premature labor.

8. In cases of extreme distortion, or diminution of the calibre of the pelvis by morbid products, prohibiting the delivery of a "*viable*" fœtus entire by any means we possess, a due regard for the safety of the mother, which would be more or less compromised by the severe operations necessary at the full term of utero-gestation, may justify the adoption of this operation in the early months of pregnancy.

9. The death of the fœtus in utero at the commencement of the last month of pregnancy, certain disorders of pregnancy, and dangerous uterine hæmorrhage, have been deemed a sufficient justification of this practice.

10. The operation should neither be resolved upon, nor performed, without a deliberate consultation with other members of the profession.

11. After the operation, "the utmost care should be taken to guard against the attack of shivering and fever," which is an occasional consequence.

12. A nurse whose nipples are small should always be in readiness to afford nourishment to the child, until the maternal secretion of milk takes place.

of utero-gestation are distinctly marked. The list amounts to thirty-six cases of eight months' children, and thirty-four of seven months. Of the thirty-six eight months' children, there died during the month of childbed, only *eight*—of the thirty-four seven months' children, there died during the month, *twenty-one*."—*Merriman's Synopsis of Difficult Parturition*, p. 182, note.

* Med. and Chir. Trans. vol. iii. p. 142.

Dr. S. Merriman introduces a rule which I have taken the liberty of omitting ; it is this : “ If upon examination before the operation is performed, it should be discovered that the presentation is preternatural, it might be advisable to defer it a few days, as it is possible that a spontaneous alteration of the child’s position may take place, particularly if the presentation be of the upper extremity.

Without questioning the possibility of such a spontaneous rectification, I must say that I cannot but agree with the objection contained in the following quotations from Dewees and Hamilton : “ Even at the full term,” the former remarks, “ we believe that no accoucheur would always pronounce positively on the part which may present itself to the os uteri. If then he cannot at the full time, when it must certainly be less difficult, and less hazardous—how can he, without a prodigious risk of being mistaken, decide at seven months, when the neck of the uterus is not effaced—when it requires some force to pass the finger—when it must be passed with the greatest care and delicacy, that the membranes be not ruptured—and where, did we employ a pressure sufficient to determine the nature of the presenting part, the membranes would almost certainly give way ; we ask, under all these advantages, how can we ascertain, with such precision as would render the examination available, the situation of the child at the period of utero-gestation.”*

Dr. Hamilton observes, “ even admitting that, in the ordinary course of practice, there should occur seventeen cases of præternatural presentations in seventy-eight cases of premature labor, (according to Dr. Merriman’s statement,) that would, in the author’s opinion, be an argument in favor of the induction of premature labor ; for nobody can doubt

* Compendious System of Midwifery, p. 609.

that it is easier to turn an infant weighing six pounds, than one whose weight is seven pounds.”*

Dr. Hamilton further adds, “that Dr. Merriman seems to suppose, that if an upper extremity presents, the position of the infant may be spontaneously altered in the course of a few days; but this is quite at variance with the author’s experience.”

* Practical Observations, Part II. p. 128.

ESSAY II.

ON VERSION, OR TURNING.

Version. Fr. ' *Die Wendung.* G.

THE term *version*, or *turning*, is applied by midwifery teachers generally, to that manual operation by which one presentation is substituted for another, less favourable ; and in a more limited sense, to the rectification of certain malpositions.

For the furthering of one or other of these purposes, it has been known to the profession for a considerable period ; but the full benefit of the operation, and the class of cases in which it is useful, is of much later discovery. A slight sketch of the history of the operation, may not be uninteresting.

Among the ancients, we find Hippocrates referring to bringing down the head. Celsus* advises us to seize the feet when the head is not within our reach, but this is only to be done when the child is dead. Ætius, and Paulus Æginetus are the first ancient writers who recommend this manœuvre to be attempted with a living child. Rhodion,† Franco, and Ambrose Paré,‡ mention the operation as an usual one, but

* Lib. vii. cap. 29.

† Des divers Accouch. fautt. 25, 27.

‡ Livre 24, ch. 33, p. 700, Ed. 1573.

without much detail. Guillemeau, however, who was a pupil of Ambrose Paré's, and who may have been indebted to him for his knowledge on this point, enters into minute details, and displays perfect familiarity with it.

It will, I think, be more distinct and intelligible, if we trace the history among our own writers first, and subsequently among those of France, &c.

"The Breviarie of Health," &c., compiled by Andrew Boord, otherwise called "Andreas Perforatus," and remarkable as the founder of that class of the medical fraternity known as "Merry Andrews," was printed in London in 1598. The colophon at the end of the first book is as follows:—"Here endeth the first Booke, examined in Oxforde in June, in the yeere of our Lord D.CCCC.XLVI, and in the raigne of our Sovereigne Lord King Henry the Eyght, King of England, Fraunce, and Ireland, the xxxviii. yeere."

In the first book we find that "the 267 chapter doth shew of a woman's labour or delivering." The author says, "peradventure, the child is turned in the mother's body, and that the head doth not come first, then there is great peril;" and he recommends, "If the head of the child does not come forth first, the midwife then must turne the childe that the head may come forth first, and let the midwife anoint hir hand with y^e oyle olive."

The first midwifery book ever printed in English, is Raynald's "Byrth of Mankinde, or the Woman's Boke," dated 1634. It is a translation (with additions) from a Latin translation (made in 1535) of the Dutch treatise of Eucharius Rhodion. The author seems to have had some notion of rectifying the erroneous circumstances (or what he thought to be such) of head presentations; but he makes no reference whatever to bringing down the feet. For instance, he says, "when the childe cometh headlong, one of the hands coming

out and appearing before, then let the byrth proceed no farther, but let the midwife put in her hand, and tenderly by the shoulders thrust in the byrth again, so that the hand may be re-settled in its place, and the byrth to come forth ordinarily and naturally.”* Similar directions are given for the management of footling cases.

In 1635, Guillemeau’s work was translated into English ;† and we are indebted to it for a more accurate knowledge of this operation. He does not, however, seem to have regarded it as peculiarly suitable in arm presentations, for his rules in such cases are the same as Raynald’s ;‡ but he gives full directions for extracting by the feet, when they are discovered to be near the os uteri,§ impressing upon the reader most strongly, the necessity of seeing both feet ; “ for it were enough to teare the child asunder, and so kill both him and his mother, to draw him forth by one foot.” When speaking of presentations of the “ belly and breast,” after recommending cephalic version, he proceeds : “ But if the head cannot be easily brought downwards, or that the belly and top of the thigh be nearer unto the passage, then the chirurgion shall put his right hand along the child’s thigh, to finde one of his feet, which being found, he shall cast about it a riband with a sliding knot, and then shall he seek for the other, and bring them both gently to the passage, and so draw him forth by the feet.”||

In some cases of powerless labor, he practised it as a very

* Book 2d. chap. iii. p. 105.

† Child-byrth, or the Happy Delivery of Women, &c. ; written in French by James Guillemeau, the French King’s Chirurgion.

‡ Page 148.

§ Page 154.

|| Page 168.

efficient remedy—of which I extract the following example :
 “ Being at Moret with Count Charles, I was called, together with the late Mons. de la Corde, one of the king’s physitians, to deliver a poor woman which had been in travail two days and two nights ; the waters being broken and the child left dry, the necke of her matrice was closed, she being no more urged with pains or throwes, which I observed by slipping my hand up into the said necke, and getting two of my fingers therein, where feeling one of the child’s feet, I persuaded myself that I should deliver her well, which I did in this sort : first, when I had placed her well, I anointed my hands with butter and hog’s grease melted together, and with store thereof I anointed the inward neck of the matrice, as well as possibly I could ; and when I had somewhat dilated the said necke, with three of my fingers, I cast a riband with a sliding knot upon the child’s foot, fastening it gently ; and then again dilating the said necke, I found out the other foot, upon which I slipped another riband, as I had done upon the former ; then did I draw both the ribands, and brought the two feet together, which, when I had drawne out unto the buttocks, I beganne againe to anoint as before ; and then taking a napkin, lest it should slip, I bad the woman force herself as much as shee could possibly, especially when shee felt her pains and throwes coming ; and then drawing sometimes directly, and sometimes to the one side, so as to enlarge the passage, I drew in the child gently, turning the belly thereof downward, that the chin might not catch in the *os pubis*, as I have noted before.”*

In the “ Childbearer’s Cabinet,” published in London, in 1653, no notice whatever is taken of turning, either by external or internal manipulation.

In the "Compleat Midwife's Practice enlarged, by Dr. John Pechey," 1698, reference is made to version in footling cases,* and in arm presentations, both by external and internal manipulation. "If it happen that the child hasten to the birth, with the legs and arms distorted, the midwife ought not to hasten the woman, but immediately cast her on her bed, where she may direct the woman to roul herself to and fro, or else she may gently stroke the womb of the woman as she lies, till she have reduced the infant to a better posture; if this profit not, the midwife must take the legs and close them together, then if she can, she must get her hand about the arms of the child, and in the safest way she can, direct it to its coming forth; *though it be the safest way to turn the infant* in the womb, and by that means compose it to the natural birth."†

Portal's "Compleat Practice of Men and Women Midwives," was translated in 1705, and was a very valuable acquisition. I need not enter into details here, as I shall notice the original.

Daventer's work‡ was translated "by an eminent physician" in 1716, and in it allusion is made to turning by the foot, as a matter of course, and it is stated that in arm presentations it is not absolutely necessary to return the arm: "and though the arm hanging down in the passage may be less commodiously put back or retained, yet they are to penetrate and seek for the feet; very often the time is lost in putting back an arm or in retaining it, for experience teaches us that sometimes a hand can more easily penetrate when the arm hangs down than when the same is thrust back again."§

* Page 142.

† Page 143.

‡ Operationum Chirurgicarum novum Lumen exhibentium obstetricantibus, &c. Lugduni Batavorum, apud J. et H. Verbeek, 1733. (2d edit.)

§ The Art of Midwifery improved, translated from Daventer, p. 194.

Dionis' work on Midwifery* was translated in 1719, and was a further addition to the knowledge of the time. He seems to have lost all fear of footling cases, for he objects to their being put back,† and gives the preference to bringing down the feet rather than the head in some cross births. He says—"Of all labours, that in which the child presents with one arm only, gives the sufferer the greatest trouble; for lying crossways in the womb, it is impossible for him to bring it away without turning it." "Some would have us fetch away the child by the head; but it is impracticable." "Whenever I attempted to do it by the head, I had a great deal of trouble, and was sure to be disappointed; wherefore I advise all men-midwives, and others who practice the art, to turn the child, and fetch it away by the feet."‡ In shoulder presentations, however, he recommends cephalic version, when possible, and likewise when the belly or back presents.§

I have noticed particularly these works, because, though they are but translations, yet it was by them that the science of midwifery was improved in this country, and they illustrate its history as well as if original.

A "Mrs. Jane Sharp, Practitioner in the Art of Midwifery above forty years," published the result of her experience in 1725, but she mentions neither cross-births nor version. Her work is far inferior to those of the French midwives of a still earlier period.

Mr. Chapman,|| who is next on my list of authors, seems

* A General Treatise on Midwifery, etc. 1719.

† Page 210.

‡ Page 228.

§ Page 230.

|| A Treatise on the Improvement of Midwifery, by Edward Chapman, 2d edit. is dated 1735.

to have been so impressed with the value of this operation, that he somewhat overrates its applicability. Thus he remarks, "if he (the operator) finds the face of the child turned towards the os pubis, it is much better to turn the infant, and bring it out by the feet, than to put the labour upon nature." And again, "thus I say, a child presenting with its head is often to be turned and delivered with the feet first: in all other postures whatever, always with the feet first, and always turned, except when it presents with the feet, and nature has saved the artist that labour, and the mother that pain."*

Mr. Giffard published his cases in 1734.† He turned and delivered footling in funis, arm, and placenta presentations, in the second of twin children, and in convulsions.‡

Mr. Dawkes, in 1736, published a curious catechism of midwifery, in which he follows the rules laid down by Chapman, as to turning.§

In 1742, Sir Fielding Ould, of this city, published his valuable work.|| He advises turning with the second of twin children,¶ in deformity of the pelvis,** and in arm presentations. "If the hand be not far advanced, it must be instantly put back into the womb," &c. &c. "If the hand be so far advanced that it cannot be put back, the operator must dilate the orifice, so as to thrust up his hand by the side of that of the infant, taking hold of the feet as above, *and in proportion*

* Pages 32, 33.

† Cases in Midwifery, by M. W. Giffard; revised by Dr. Hody, 1734.

‡ Pages 40, 44, 46, 54, 118, 114.

§ The Midwife rightly instructed, &c., by T. Dawkes, Surgeon, 1736.

|| A Treatise on Midwifery, in three parts, by Fielding Ould, Man-midwife.

¶ Page 55.

** Page 86.

as the feet advance forward, the hand will retire into the womb."*

Dr. Brudenell Exton† (1751) advises the operation in arm, back, funis, and placenta presentations, and in the second of twin children. "But it may sometimes happen, if the second child present right, (which it very seldom does,) and the pains strong—so that the waters form themselves immediately, and the head is perceived to follow fast—then indeed, as nature will in all probability soon accomplish her own work, I think it may be very safe to leave it to her."‡ He also speaks of rectifying malpositions of head, by external and internal manipulation.§

In 1752, Dr. Smellie published his "Treatise on the Theory and Practice of Midwifery." He mentions three classes of preternatural labors, in which turning is requisite, and may be accomplished.||

Mr. Pugh (1754) follows Chapman, and recommends turning in all presentations but the head and feet, and also in the second of twin children; "and so likewise, even in a natural posture, when, for certain causes, the delivery is not promoted, but is rather to be dreaded, and threatens death to either the mother or child, or both, as in violent hemorrhages of the womb, excessive weakness or convulsions, that may happen to the patient during labor, or the pelvis too narrow for the head to pass by the force of the pains, it may be necessary to turn and bring away the child by the feet; for as in all these cases both mother and child run a great hazard of being destroyed, we must use all possible dexterity and

* Page 108.

† A new and general System of Midwifery, 1751.

‡ Pages 84, 73, 81, 83.

§ Page 67.

|| Vol. i. p. 207. 6th Ed.

expedition, whilst mother and child have a sufficient degree of strength to go through the operation.”*

Dr. Cooper† (1766) has given very distinct directions for the operation, and pointed out very accurately the cases in which it is admissible.

Dr. Burton,‡ (3rd ed. dated 1769,) Dr. Memis, of Aberdeen,§ (1765,) and Dr. Foster, of this city,|| (1781,) each advise turning in all cross births, and the second-named author in the second of twin children, and in floodings.

From this period version was admitted amongst midwifery operations in all systematic works, and the opinions of practitioners became gradually more definite concerning the cases for which it is suited, and the mode of performing it. As the information contained in these writings will be found arranged in the subsequent portion of this Essay, I shall merely (for the purpose of completing this part of the history of the operation) refer to the works of Johnson,¶ Perfect,** Dease,†† Spence,‡‡ Aitken,§§ Hamilton, sen.,||| Edinburgh

* Treatise on Midwifery, by Benjamin Pugh, Surgeon, 1754, pp. 34, 37, 39, 35.

† A Compendium of Midwifery, by Thomas Cooper, M.D., London.

‡ An Essay towards a new System of Midwifery, 3d edit. 1769, pp. 198, 203.

§ The Midwife's Pocket Companion, 1765, pp. 158, 174, 176.

|| Principles and Practice of Midwifery, corrected by Dr. Sims, 1781, p. 190.

¶ New System of Midwifery, 1769, p. 219.

** Cases in Midwifery, vol. i. pp. 31, 171, 222, 224, 263, &c. &c. vol. ii. pp. 110, 264, 271, 281, &c. &c.

†† Observations on Midwifery, by William Dease, Esq., 1783, p. 54.

‡‡ System of Midwifery, 1784, pp. 246, 249, 274.

§§ Principles of Midwifery, 1784 p. 98.

||| Outlines of the Theory and Practice of Midwifery, by Alexander Hamilton, M.D., 1784, p. 264.

Practice of Midwifery,* Haighton,† Denman,‡ Dewees,§ James Hamilton, jun.,|| Merriman,¶ Gooch,** Conquest,†† J. Clarke,‡‡ Ryan,§§ Ramsbotham,|||| Campbell,¶¶ Ashwell,*** Burns,††† F. Ramsbotham,‡‡‡ Maunsell,§§§ Blundell,||||| Collins,¶¶¶ &c., &c.

I shall now proceed to sketch the opinions of the earlier French authors in midwifery, so far as I have access to their works.

Ambrose Paré,**** (1579,) is the earliest writer I possess; and he speaks of turning and bringing down the feet, and so extracting the child.

The next work is by “Louise Bourgeois, dite Boursier,

* Anonymous, published in 1803, p. 279, *et seq.*

† Syllabus, 1814, p. 57.

‡ Introduction to Midwifery, (1st Edit. 1784 or 5; 7th Edition 1832,) p. 344.

§ Compendious System of Midwifery, 1825, p. 283.

|| Outlines of Midwifery, 1826, p. 66.

¶ Synopsis of Difficult Parturition, (4th Edit. 1826) p. 68.

** Lectures on Midwifery, edited by Skinner, 1831, p. 232.

†† Outlines of Midwifery, (5th Edit. 1831,) p. 143.

‡‡ London Practice of Midwifery, (1st Edit. 1808, said to be by Dr. John Clarke,) 6th Edit. 1833, p. 238.

§§ Manual of Midwifery, 1831, p. 535.

|||| Practical Observations and Cases, 2 vols. 1832, vol. ii. p. 47.

¶¶ Introduction to the Study and Practice of Midwifery, 1833, p. 283.

*** Practical Treatise on Parturition, 1834, p. 353.

††† Principles of Midwifery, (I do not know the date of 1st Edition) 9th Edition, 1837, p. 416.

‡‡‡ Lectures on Midwifery, &c. in Medical Gazette for 1834, p. 548.

§§§ Dublin Practice of Midwifery, 1834, p. 142.

|||| Principles and Practice of Obstetricry, 1834, p. 389.

¶¶¶ Practical Treatise on Midwifery, 1835, p. 64.

**** Johnson's Translation, 1634, p. 915.

Sage-femme de la Royne,"* published in 1617, and she appears to have deserved her name as regards this operation. She speaks of turning, in shoulder, side, arm, and funis presentation.† Touching the latter she observes :

“ Il faut remettre le nombril, scituer la femme au travers du lict, la teste et les reins fort bas, afin de faire rentrer ce qui se presente de l'enfant, puis s'estant frotter les mains de beurre frais, *chercher moyen de trouver les pieds* et les conduire à bord, puis faire coucher la femme sur la costè ou vous avez amenez les pieds : puis la remettre sur les reins et si elle a douleur, pendant qu'elle dure, tirer doucement l'enfant : si elle n'en a point, la faire efforcer et pendant l'effort, l'attirer peu à peu et lui donner des relasches pour reprendre ses forces, &c. &c.

We have already seen that Guilleméau (before 1635) had taught the propriety of bringing down the feet, which method he learned from Ambrose Parè.

M. Viardel‡ (1674) speaks of this operation as customary : in arm presentations he tells us “ aller saisir les pieds comme on a coutûme de le faire.” He mentions his turning the head in a face presentation, and his turning by the feet in mal-presentations, and in the second of twin children.§

In speaking of knee presentations he says—“ Entre une infinitè des postures auqueles l'enfant se presente venant au monde, une des moins difficiles à redresser, c'est lors qu'il presente par les genoux à laquelle on peut remedier dans fort peu de temps, pour le peu qu'on soit versè dans la pratique

* Observations sur la Sterilité, perte de Fruict, fecondité, accouchemens, etc. Paris, 1617.

† Pages 77, 78, 79, 80.

‡ Observ: sur les Accouchemens, 1674.

§ Pages 106, 112, 142.

des accouchemens, par ce que *dans toutes les mauvaises presentations de l'enfant telles qu'elles soient, nous sommes obligez d'aller chercher les pieds*, lesquels sont bien plus faciles a trouver lorsqu'il se presente par les genoux comme en estant plus pres qu'en toutes autres postures,"* &c.

Marguerite du Tertre, (1677) seems perfectly familiar with the operation, and describes it with great clearness in cases of twins or mal-presentations. ‡ Her book is in form of question and answer, one of which I shall extract :—

“Quand il presente un bras ou une epaule, que faut il faire ? Si c'est un bras que l'enfant presente, et que la teste soit proche du passage, il faut reduire le bras derriere la teste, la mettre droite, en cas qu'elle fust de costè. Mais s'il presente l'épaule avec le bras, if faut aller chercher les pieds, et les tirer à l'ordinaire.”†

Velpeau states that this operation was known to St. Germain, (1650,) Fournier, (1676,) and Amand, (1713,) but I have not access to their works.‡

Paul Portal (1685) is very clear in his directions upon the point ; he recommends putting back the arm, and turning by the feet in arm presentations.

“Mais si on ne le peut remettre dans la matrice quoiqu' assez dilatée, celui qui opère, doit glisser sa main à la faveur des bras de l'enfant, jusques à son corps, puis suivre de la cuisse à la jambe et aux pieds, faisant ce qu'il pourra pour les amener tous deux dehors ; ce qui seroit d'un grand secours pour la femme et pour celui qui opere : mais ne les pouvant pas avoir tous deux, il faut s'attacher à celui qu'on

* Page 149.

† Instruction familiere et tres facile, faite par Questions et Reponses touchant les choses principales q'une sage-femme doit seavoir, &c. 1677, pp. 96, 106, 113.

‡ De l'Art de l'Accouchemens, p. 385.

trouvera, et le tirer, sans se mettre en peine d'aller chercher l'autre, qui se trouve quelquefois fort engagé.*

M. Peu† (1694) speaks of both species of version, bringing down the head in shoulder presentations,‡ and the feet in arm cases.

If the arm cannot be returned, he observes, “ Nous nous contentons de le repousser et de le faire rentrer, pour chercher les pieds de l'enfant, les amener et les tirer selon la metode dont j'ai parlè en divers endroits de ce livre.”§

Mauriceau|| (1715) advises “ que toutes les fois que l'enfant se presente en mauvaise posture, il est plus sur et c'est plutôt fait, de le tirer par les pieds.” He indicates a point of importance as to the time of operating in some cases.

After relating a case of arm presentation, in which he turned the child, he proceeds : “ Il faut donc remarquer que lorsqu'on s'appërçoit qu'un enfant se presente en mauvaise posture, devant que les membranes des eaux soient rompues, il ne faut pas toujours attendre que ces membranes, se rompent d'elles mêmes ; car il faut quelquefois les rompre, lorsque la matrice est suffisamment dilatée à y pouvoir introduire aisement la main, quoy faisant, on retourne l'enfant avec une bien plus grande facilitè, sans faire violence à la matrice, quand il est encore dans toutes ses eaux, qui n'étant pas ecoulées, et faisant une espece de vuide, joint a leur humidité, rendent l'operation beaucoup moins laborieuse pour la mere et pour l'enfant, que lorsque les eaux étant entiere-ment evacuées, la matrice vient à embrasser immédiatement

* La Pratique des Accouchemens, p. 33.

† La Pratique des Accouchemens, 1694.

‡ Page 395.

§ Page 401.

|| Mal. des Femmes grosses, &c. p. 266, Obs. 321. 1715.

de toutes parts le corps de l'enfant, que l'on ne peut retourner pour lors, sans faire une violence à la mere."

We have heretofore quoted the opinions of Dionis, whose work was published in French in 1718, and in English in 1719.

In 1726 the valuable work of De la Motte* appeared; he treats clearly both of cephalic and podalic version,† and objects to the old plan of putting back the presenting part.‡

Jaques Mesnard§ (1753) recommends turning in malpresentation.

Puzos (1759) advises the same in "accouchemens contrenature," and in funis presentations.||

Subsequent to the date of Puzos' work, we find more or less information on the subject, in the writings of Astruc,¶ Raulin,** Deleurye,†† Maygrier,‡‡ Lachapelle,§§ Baudelocque,|||| Boivin,¶¶ Capuron,*** Gardien,††† Velpeau.†††

Upon comparing the knowledge of the early English and French writers, it must be admitted, (frankly if reluctantly,) not only that the former are far inferior to the

* Traité des Accouchemens, 1726.

† Pages 173, 369.

‡ Page 383.

§ Le Guide des Accoucheurs, &c. 1753, pp. 245, 293.

|| Traité des Accouchemens, pp. 174, 177.

¶ L'Art d'Accoucher, &c. 1766, p. 132.

** Instructions Succinctes sur les Accouchemens. Paris, 1770, p. 216.

†† Traité des Accouchemens, 1770, p. 232.

‡‡ Nouveaux Elemens de la Science et de l'Art des Accouchemens, 1814, p. 320.

§§ Pratique des Accouchemens, 1821, pp. 85, 90, 140.

|||| L'Art des Accouchemens, 6th Edit. 1821, pp. 625, 660, &c.

¶¶ Memorial de l'Art des Accouchemens, 1817, p. 213.

*** Cours des Accouchemens, 1828, p. 330.

††† Traité des Accouchemens, 1824, p. 364.

††† De l'Art des Accouchemens, 1835, p. 385, Brussels Ed.

latter, but that the English were indebted to the French for a knowledge of the operation.

I regret that I cannot give much of the early history of this operation amongst the Germans; nor is much to be found in those who profess to notice its history. Kilian* refers us to the works of Rueff, (1600,) Justin Siegmundin, I. Van Hoorn, Stein,† Chernel,‡ &c., and Froriep§ gives a list of authors, among whom the earliest names are those of Kienman,|| Metzger,¶ Dethabring,** Boessel,†† Bausch,‡‡ Weiss,§§ &c.

Amongst the later writers, I possess the works of Henckel,|||| Katzenberger,¶¶ Schwabe,*** Vogel,††† Spiering,‡‡‡ Steidele,§§§ Ritgen,||||| Deventer, Plenck,¶¶¶ Wigand,****

* *Die Operative Geburtshülfe*, vol. i. p. 339.

† *De Versionis Negotio pro genio partus*, etc. 1763.

‡ *Diss. de necessario Fœtus in omni Partu præternaturali qui a situ Fœtus vitiato, dependet, versione cum suis cautelis*, 1756.

§ *Handbuch der Geburtshülfe*, p. 410.

|| *De Versione*, etc. 1757.

¶ *De Versionis in Partus negotio periculis*, etc. 1788.

** *De Determinandis Finibus*, etc. 1788.

†† *Von der Wendung*, 1795.

‡‡ *Indicationes pro Conversione Fœtus in Partu*, etc. 1794.

§§ *Neues Regulativ zur Wendung*, 1824.

|||| *Abhandlung von der Geburtshülfe*, 1770, p. 545, et seq.

¶¶ *Katechetischer Unterricht*, 1779, p. 175.

*** *Katechismus für die Geburtshülfe*, etc. 1798, p.

††† *Taschenbuch für Geburtshelfer*, etc. 1802, p. 131.

‡‡‡ *Die Pratische Geburtshülfe*, 1801, p. 224.

§§§ *Abhandlung von der Geburtshülfe*, etc. 1812, vol. iii. p. 12.

||||| *Die Anzeigen der Mech. Hülfen*, etc. 1820, p. 352.

¶¶¶ *Elementa Artis Obstetriciæ*, 1781, p. 159.

**** *Geburt des Menschen*, 1820, vol. ii. p. 174.

Carus,* Osiander,† sen., Siebold,‡ Froriep,§ Osiander,|| jun., Jöerg,¶ Busch,** Rosshirt,†† Kilian.‡‡

All these writers treat more or less systematically of version; but, as they are subsequent to the period of its adoption generally, I have not deemed it necessary, in this place, to give extracts from them.

The operation is mentioned as a customary one in the writings of Melli,§§ Asdrubali,|||| Bongioanni,¶¶ and Mazzoni, the only Italian Midwifery authors I possess.

Having concluded this investigation into the history of version, I shall next give all the statistics I have been able to obtain as to its frequency and success. In my researches, I have often had to regret the want of attention to minute details in many reports of hospitals, dispensaries, &c. I have for greater accuracy quoted the source of my information.

* Lehrbueh der Gynæeologie, 1820, vol. ii. p. 292.

† Handbueh der Entbindungskunst, 1830, vol. ii. p. 320.

‡ Lehrbueh der Geburtshülfe, 1831, p. 268.

§ Handbueh der Geburtshülfe, 1832, p. 404.

|| Die Ursachen und Hulfsanzeigen der unregelmässigen und schweren Geburten, 1833, p. 320.

¶ Handbueh der Geburtshülfe, 1833, p. 436.

** Lehrbueh der Geburtskunde, 1833, p. 544.

†† Die Anzeigen zu dem Geburtshülfflichen Operationen, 1835, p. 69.

‡‡ Die Operative Geburtshülfe, vol. i. p. 339.

§§ La Comare Levatrice, etc. Venice, 1766, p. 259.

|||| Trattato Generale di Ostetricia, 1812, vol. ii. p. 123.

¶¶ Lezioni Elementari di Ostetria, 1834, p. 294.

DATE.	AUTHOR.	HOSPITAL, ETC.	CASES OF VERSION.	TOTAL NO. OF CASES.	REFERENCES.
1781	Dr. Bland,	Westminster Dispensary,	9	1,897	Merriman's Synopsis.
	Dr. Jos. Clarke,*	Dublin Lying-in Hospital	48	10,387	Trans. of Assoc. vol. i.
	Dr. Merriman,	London, Private Practice,	14	2,947	Synopsis, 4th ed. p. 335.
1818	Dr. Granville,	Westminster Dispensary,	8	640	Report of, p. 25.
1826 to 1833	} Dr. Collins,	Dublin Lying-in Hospital	33	16,414	Prac. Treat. on Mid. p. 73
1828					
	Dr. Cusack,	Wellesley Dispensary,	5	313	Dublin Hospital Reports, vol. v. p. 435.
1832	Dr. Maunsell,	Do.	2	442	Edin. Journal, No. 117.
1833	Do.	Do.	0	416	Dub. Jour. vol. v. p. 367.
1828	Mr. Gregory,	Coombe Hospital,	3	691	Dub. Hosp. Rep. vol. v.
1834 to 1837	} Dr. T. Beatty,	Cumberland-st Hospital,	6	1,182	Dublin Journal, vol. viii. p. 66, vol. xii. p. 273.
1836					
1837	} Dr. Churchill,†	Western Lying-in Hospital,	11	1,700	See Reports.
1838					
	Mr. Mantell,		8	2,510	Amer. Med. Jour. vol. iv. p. 245.
			147	39,539	

* This is somewhat uncertain. Dr. Clarke gives 48 *cross births*, which were treated in the usual manner—I suppose by version.

† I have taken these numbers as they stand in the Hospital books at the present June 20, 1840.

DATE.	AUTHOR.	HOSPITAL, ETC.	CASES OF VERSION.	TOTAL NO. OF CASES.	REFERENCES.
Dec. 1799 to July 1811	Mad. La Chapelle,	Maison d'Accouch.	155	15,654	Pratique des Accouch. p. 198.
	} Mad. Boivin,*	Maternité,	218	20,357	Memorial de l'Art, &c., p. 354.
1808					
	M. Ramboux,	Clin. de Liege,	1	216	Bull. de la Faculté, &c., vol. ii. p. 73.
1825 1826	} Dr. Merrem,	Cologne,	3	157	Do. vol. xvii. p. 283.
1828					
	M. Papavoine,	St. Louis, Paris,	1	240	Jour. de la Progres de Med. vol. xiv.
1829	. . . . .	Hotel Dieu, Paris,	2	280	Velpéau, l'Art d'Acc. p. 50.
1830 1831	} M. Ciniselli.	Clin. de Pavia,	2	94	Gaz. Med. de Paris, 1835.
1833					
	M. Mazzoni,		18	481	Prospetto Ragionato, &c.
			400	37,479	

* I have omitted M. Baudelocque's cases, as they appear to be included in those of Madame Boivin.

DATE.	AUTHORS.	HOSPITAL, ETC.	CASES OF VERSION.	TOTAL NO. OF CASES.	REFERENCES.
1789 to 1792 and 1801 to 1806	M. Boer,*	Vienna - - -	51	6,666	Die Natürliche Geburtshülfe, &c. vol. i. pp. 72, 148, 237, vol. iii. pp. 62, 130, 245.
1801 to 1807	M. Naegelè,	Heidelberg, - -	22	1,411	Velpeau's Tab. View.
1812 and 1813	G. M. Richter, Do.	Moscow - - - Private practice, -	25 27	2,571 624	Synop. Prac. Med. Obstetric, p. 416.
1818 to 1829	E. Von. Siebold,	Wurzburg Hospital,	6	310	Siebold's Journal, für die Geburtshülfe &c. vol. i. pp. 114, 576.
1829 to 1832	Do.	Berlin Hospital, -	60	2,055	Do. vol. iii. to x.
1832 to 1833	M. Ritgen,	Giessen, - - -	1	180	Do. vol. vi. pp. 34, 262.
1833 to 1834	M. C. G. Carus,	Dresden, - - -	29	2,133	Do. vol. vi.
1834 to 1837	M. Kilian,	Clin. de Prague, -	63	2,350	Bull. de la Faculté, &c., vol. xxv. p. 352.
1837 to 1838	M. Klugè,	La Charité, Berlin, -	19	1,254	Siebold's Journal, vols. vi. vii.
1838 to 1839	Prof. Andrée,	Breslau, - - -	5	181	Do. vol. vi. p. 154.
1839 to 1840	Dr. Brunatti,	Dantzic, - - -	3	380	Do. vols. vii. ix.
1840 to 1841	Dr. Theys,	Trier, - - -	1	49	Do. vols. vii. viii.
1841 to 1842	Dr. Henne,	Königsberg, - -	2	156	Do. vol. viii. p. 121.
1842 to 1843	Dr. Voigtel,	Magdeburg, - -	1	29	Do. vol. viii. p. 831.
1843 to 1844	Dr. Küstner,	Breslau, - - -	6	176	Do. vol. ix. p. 92.
1844 to 1845	Dr. Adelman,	Fulda, - - -	1	166	Do. vols. xi. xiv.
1845 to 1846	Dr. Siebold,	Marburg, - - -	8	321	Do. vols. xi. xii. xiii.
1846 to 1847	Do.	Göttingen, - -	7	504	Do. vols. xv. xvi.
1847 to 1848			337	21,516	

Thus we see that the records of English practice yield 39,539 cases, and 147 cases of version—or about 1 in 269; French practice, 37,479 cases, and 400 cases of version—or about 1 in 93½; and German practice, 21,516 cases, and 337

* I have taken these numbers from M. Boer's work, but am unable to reconcile them with those generally quoted.

cases of version—or 1 in $63\frac{2}{3}$. The whole number of cases is 98,534, and of version, 884—or about 1 in $111\frac{1}{2}$.

It is not so easy to make out a satisfactory table, shewing the danger of the operation to the mother and child, from the want of details. Many writers do not mention whether any of the mothers died, and some omit the result as regards the child. I cannot forbear expressing my estimation of the minuteness and accuracy of Dr. Collins's statements, and the excellence of the tabular views he has given.

In the following table, I have taken all the numbers upon which I could depend, and though the list is not extensive, I believe that the average mortality will be found pretty correct.

AUTHORS.	NO. OF VERSION CASES.	MOTHERS LOST.	CHILDREN LOST.
Mad. La Chapelle	155	Not stated.	45
Mad. Boivin,	218	Not stated.	48
Dr. Clarke,	48	6	35
Dr. Collins,	33	3	13
Dr. Cusack,	5	0	2
Mr. Gregory,	3	0	0
Dr. Beatty,	6	1	6
Dr. Churchill,	11	0	8
Professor Andrée,	5	0	3
Dr. Klugè,	7	1	3
Dr. Küstner,	6	0	2
Dr. Adelmann,	1	0	0
Dr. Boer,	26	0	10
Dr. Mazzoni,	18	0	7

Thus, in 169 cases, where the result to the mothers is specially mentioned, 11 mothers died—or 1 in 15.

I do not give this result as the exact mortality of the *operation*, because it is evident that the deaths in some cases may have been owing to the *cause* which demanded the operation—as in placenta prævia; but as we find that even in several of these cases, the fatal termination was evidently more owing to the operation than

to the hemorrhage, I am inclined to think the calculation not very far from the truth. However, any erroneous inference from these statistics, will be guarded against by the recollection of the various and serious accidents which require the operation.

In 542 cases, where the result to the child is detailed, 182 children were lost, or rather less than 1 in 3.

To a certain extent the same observations apply to this calculation of the mortality amongst the infants, and similar allowance must be made. One in four is stated as the mortality in footling cases, which must evidently be below the proper estimate of version cases.

From the quotations and references I have made in the former part of this paper, it will be easily gathered that the *object* of the operation is threefold.

1. To place the head in a more favourable relation to the pelvis, or to substitute the head for some other presentation.

2. To substitute the inferior extremities for some other less favourable presentation.

3. To hasten the termination of labor, in consequence of complications, as *convulsions*,* *flooding*, *prolapse of the funis*,† &c.

It has been proposed‡ to turn and deliver instantly in case of the sudden death of the mother, instead of having recourse to the Cæsarean section; but the mortality amongst children so delivered would preclude this application of it.

As it regards the complications in which this operation has

* Giffard's cases, p. 114. Ramsbotham's Observations, vol. ii. p. 264.

† Merriman's Synopsis, p. 100. Gooch's Lectures, p. 239. Conquest's Outlines, p. 143, etc. etc.

‡ Siebold's Journal für die Geburtshülfe, etc. vol. vi. p. 506.

been recommended, this is not the place to enter upon the consideration of them ; I merely repeat what others have said or done, without at present questioning or affirming the propriety of such practice.

There is so much difference in the means by which the first and second objects are attained, that it is necessary to say a few words upon each.

1. *Version by the head or cephalic version*, as it is termed, consists (*a*) in clearing the upper outlet of any part which may hinder the descent of the head ; (*b*) in seizing the head, and bringing it down to the brim of the pelvis ; (*c*) or in rectifying the malpositions of the head.

As the majority of children enter the world head foremost, this mode was decided to be the standard of natural presentation at a very early period, and attempts were made to correct any deviations. Rhodion, Raynald, &c., endeavoured to change footling into head presentations, but not by internal manœuvre. After the discovery by Amb. Parè, Guillemeau, and others, of the ease with which labor could be terminated by bringing down the feet, cephalic version went very much out of fashion. By the great bulk of recent writers (especially in our own country) it is either not mentioned at all, or with reprobation. Still there are cases in which its suitability could not be overlooked, and in consequence we find an admission here and there of its utility. Smellie recommends it in certain malpositions of the head ; Mauriceau* advises it if the neck present ; and De la Motte,† Melli, and Roux‡ speak of success obtained in this manner. Le Roi preferred it generally to version by the feet.§

* *Traité des Accouchemens*, p. 262.

† *Traité Compl. des Accouchemens*, p. 435.

‡ *Obs. sur les Pertes*, p. 232.

§ *Pratique des Accouchemens*, 1777, p. 9.

These, however, were only exceptions to the rule: it remained for Flamant,* Professor at Strasburgh, to recal the attention of the profession to the operation, in such a way as to procure its re-admission (at least on the Continent) into the number of valuable obstetric operations. His example has been followed by several German and French writers. Labbe,† Eckhardt, and Wigand,‡ published successful cases in 1803; Schnaubert in 1815; D'Outrepont and Regnaud in 1825. Busch§ gave an account in 1826 of fifteen cases, in which fourteen infants were born living. In 1827, Ritgen collected forty-five successful cases.|| Riecke has had sixteen cases.¶ It has been eulogized by MM. Vallée, De Roche, Ubersaal, (1823), Stolz,** and Toussaint.†† Jöerg and some others advise the head to be seized and placed in position when nearest the neck, and Gardien‡‡ seems inclined to recommend it strongly, "if practitioners were only as well versed in the use of the forceps as the Professor of Strasburgh."

One of the few British writers who speak well of it, is the distinguished Professor at Glasgow, Dr. Burns, who says: "For instance, if the patient be known usually to have a short labour, if the pains be brisk, the os uteri dilated, or in a relaxed and easily dilatable state, the liquor amnii retained, and the head moveable, then the head may, without any

* Journal Complement, 1799, vol. xxvii. p. 262; vol. xxviii. p. 193; vol. xxx. p. 3, &c.

† Journal Complement, 1803.

‡ Ibid, vol. xxx. p. 3.

§ Ibid.

|| Ibid, vol. xxx.

¶ Archiv. Gen. de Med. vol. xxii.

** Journal Hebdom. 1831, vol. i. p. 5.

†† Annal. de la Med. Phys. vol. vii. p. 470.

‡‡ Traité d'Accouchemens, vol. ii. p. 436.

difficulty or much irritation, be placed in the proper position, with a fair and reasonable chance of success.”*

I may also cite the testimony of Dr. Dewees, who acknowledges that “should nothing but the position of the head, with a slightly diminished capacity in the antero-posterior diameter, affect the labor, we may sometimes enable the woman to deliver herself, provided the waters have discharged themselves, by the aid of two or three fingers within the vagina, and applied to the side of the head, so as to carry the vertex towards one of the acetabula ;”—“when thus placed, we may commit the termination to the natural efforts, provided no other circumstance complicates the labor.”†

It is stated as an *objection* to the employment of this kind of manipulation, that it is more difficult to catch firm hold of the head and to bring it to the upper outlet ; that if we succeed in bringing it to the brim we can do no more, but must then leave it to nature or use the forceps. To these and similar objections, Velpeau has returned the following answer : “1st. It is not always very difficult to seize the head, and to exert considerable force upon it. 2ndly. If the waters have not been long discharged, one may often without difficulty seize the vertex and bring it to the centre of the brim, however far it may have been distant. 3rdly. That in general it is better to force the head to descend by pushing up the presenting part, than by bringing down the head. 4thly. That delivering by the breech is far from being a simple and safe operation ; as regards the child it is less so than cephalic version, even if the forceps should afterwards be applied.”‡

* Midwifery, p. 418.

† System of Midwifery, p. 293.

‡ L’Art des Accouchemens, p. 390, Brussels Edit. I take this opportunity of acknowledging the aid I have derived in the composition of these Essays, from the researches of M. Velpeau.

No one can for a moment deny that there is considerable weight in the objections I have named ; but a more detailed investigation will shew that they are valid only against an indiscriminate employment of the operation, and not against its use in the cases to which it ought to be confined. These cases may be divided into two classes : 1, where the pelvis is of sufficient size, and nothing but the *malposition* of the child's head calls for interference ; 2, in certain *malpresentations*, such as the neck or shoulder, and perhaps in a few arm cases, if the uterus be not strongly contracted, and especially if the waters have not escaped.

It is evidently not calculated for any case where prompt delivery is necessary.

Its *advantages* are found to be—first, a greater facility in reaching the head, for it is not proposed to be used in cases where the feet are near the os uteri ; and secondly, a vast saving of infantile life. This operation will be no more fatal to the child than natural labor, if performed early, whereas it is said that one-fourth of all footling cases die,* and we have seen that in version by the feet one in three die.†

2. *Turning by the feet, or podalic version. (Velpéau.)*—This was known to the ancients,‡ but confined by most of them to the case of dead children. To Ambrose Paré we are indebted for demonstrating its facility and comparative safety, and for inculcating it in practice. His distinguished pupil, Guillemeau, followed in his footsteps, to be himself succeeded

* See Boer, Stein, Osiander, Carus, Collins, etc. etc.

† See page 52.

‡ “ We learn from *Ætius*, who lived probably about the fifth century, that *Philomenes*, whose writings (except those preserved by *Ætius*) are now lost, discovered a method of turning and delivering children by the feet in all unnatural presentations.”—*Denman's Introduction*, p. 345.

by others of brilliant talent and profound research, who cleared up the difficulties, and settled the limits, and laid down the rules for the operation. I have already referred specifically to most of them, and have quoted from so many of the earlier writers, that I shall now merely refer the reader to the first part of this paper.

The peculiar *advantages* of version by the feet are—

1. That it gives to the operator the entire control over the whole process of the labor, so that he can regulate its duration, either acting with, or independent of, the pains.

2. That though inferior in its results to labor with head presentation, it is about equal to any other, and superior to some.

3. That in some cases, it is the only chance of saving the child's life, or of avoiding evisceration.

4. That in certain cases it affords a probability of saving the mother's life, when other means are hopeless.

On the other hand, its *disadvantages* are not to be overlooked, for—

1. From the distance the hand has to traverse, and the difficulty of seizing the feet and of turning the child in utero, there must ever be a fearful risk of injury to the mother.

2. The mortality amongst the infants thus brought into the world is very great ; as far as our statistics extend, they yield 174 out of 518 delivered—or about 1 in 3.

From all that we have said, it will not be difficult to specify the *cases to which the operation is applicable*.

1. It may be used in all cases of *malpresentation*, whether of the superior extremities or trunk.

2. If upon the introduction of the hand it be found impossible to rectify the *malposition* of the head, we are advised to seek for the feet and bring them down.

3. In all cases of *placenta prævia*, many cases of *ruptured uterus*, *convulsions*, *prolapsed funis*, &c. the operation is available, and has been used with great success.

It is right to mention that Denman and some other writers recommend turning when the pelvis is slightly too narrow for the child's head, but I must confess that this practice appears to me more than questionable.

The next point for our investigation is the *period most suitable* for making the attempt, so as not to interfere rashly on the one hand, nor to delay too long on the other, "*neque temerè nec timidè*——." Of the two errors, it is hardly too much to say, that excessive delay is the more serious.

1. If the case be one requiring *cephalic* version for the rectification of a *malposition*, it is clear that the operation can only be safely, if at all, performed before the uterine efforts have wedged the head into the upper strait; the attempt should be made so soon as it is evident that the natural powers will not rectify the malposition. It will be an additional motive for *prompt* assistance, if we find the pains violent, and that the patient have had many children, lest the head, not being able to enter the brim, should be turned aside, and forced through the uterine or vaginal parietes.

2 (a) If we are called to an *arm presentation*, or any demanding *podalic* version, before the escape of the liquor amnii, and we find the *os uteri* hard and undilatable, it will be advisable to wait until some change takes place, before we introduce the hand: neither is there any risk worth mentioning, provided we remain with the patient, to operate instantly if the waters break. (*Baudelocque, Hunter, &c.*)

(b) If we see the patient before the rupture of the membranes, and find the *os uteri* soft and dilated or dilatable, there is no reason for deferring the attempt, if the case

require this kind of interference, and great advantage in operating while the uterus is distended. “If we take it when the os uteri will admit the finger and knuckles, it is the better time, because we then turn the child as if in a bucket of water; and this gives us so clear an advantage that it needs no explanation.” (*Clarke,* Foster,† Gooch,‡ Ashwell,§ Ramsbotham.||*)

(c) If the os uteri be dilatable, the sooner the attempt is made after the escape of the waters, the better. Gardien¶ says that the most favorable moment is just when the waters break.

(d) After the escape of the waters, we sometimes find the os uteri neither rigid nor much dilated, and the pains moderate. In such cases, no time should be lost: the hand should be introduced into the vagina, and gentle, yet firm and persevering efforts made, to pass the hand into the uterus. Dr. Blundell says**—“In ordinary cases, if the mouth of the womb be as broad as a crown piece, and if the softer parts be relaxed thoroughly, the introduction of the hand is not exposed to greater risk than usual; there seem to be no circumstances preclusive of the operation, and the sooner you commence the better.”

(e) So far, although these cases are each more serious than the other, yet in none of them has any very great difficulty, either of decision or of execution, been experienced. We are, however, often called to a class of cases where our utmost judgment, patience, and skill will be needed. I refer

* London Practice of Midwifery, p. 245.

† Principles and Practice of Midwifery, p. 196.

‡ Lectures, p. 233.

§ On Parturition, p. 355.

|| Observations, vol. ii. p. 48.

¶ Traité des Accouchemens, vol. ii. p. 439.

** Principles and Practice of Obstetrics, p. 391.

to those cases of arm presentation, where, in the language of Foster, “the membranes have been a long time ruptured, the waters totally evacuated, and the womb closely contracted around the fœtus, which is then thrust considerably into the pelvis, the parts of the woman being dry, hot, tender, and often in a state of inflammation and tumefaction, especially when unskilful endeavours have been used to extract or turn the fœtus, or to dilate the parts.”*

In such a case, to force the hand through the os uteri would be to rupture that organ, and cause the death of the woman. It is admitted by all authors, I believe, that the operation must be postponed for a time, and means tried to soften the uterus and suspend its contractions. For this purpose, all are agreed in the propriety of taking sixteen or eighteen ounces of blood from the arm, and following up this with a large dose (gtt. lxxx. to gtt. c.) of laudanum. (*Denman, Merriman,† Hamilton, jun., Ashwell,‡ Burns,§ Blundell.||*) Dr. Collins¶ has proposed another remedy of great value. He says—“In such a situation, where the individual is strong and plethoric, twelve or fourteen ounces of blood should be taken from the arm, and a table-spoonful of the following mixture given every half hour, which I have found exceedingly useful, both in quieting uterine action, and inducing relaxation :

R. Aquæ Fontis, $\tilde{\text{z}}$ vi.
 Antim. Tartar. gr. iv.
 Aceti opii, gtt. xxx. M.

* Principles and Practice of Midwifery, p. 196.

† Synopsis, p. 89.

‡ On Parturition, p. 356.

§ Midwifery, p. 420.

|| Obstetricy, p. 397.

¶ Practical Treatise, p. 67.

By these means, after the lapse of a short time, we shall find the uterus relaxed, and the os uteri soften, so that with a little patience, gentleness, and time, we may attain our object.

3. When the cause is one of *placenta prævia*, or even of *accidental hemorrhage*, (if it demand delivery,) it is a general rule to operate as soon as possible. The os uteri seldom offers any resistance, owing to the loss of blood, and as this loss is necessarily increased by the natural efforts in unavoidable flooding, it is evident that the earlier we deliver, the better for the patient.

If we decide upon trying this operation in *convulsions*, *prolapsed funis*, or *ruptured uterus*, it will be wise to attempt it as soon as the state of the os uteri will permit.

Method of Operating.—This operation is usually divided into three stages; the introduction, the turning, and the extraction. I shall shortly describe these, in each kind of version.

1. *Cephalic Version.*—The rectum and bladder having been previously emptied, the patient is to be placed in the posture most convenient to the operator; some recommend that she should lie on her back—(*Chapman, Dawkes, Smellie, Dewees*;) others that she should kneel (*Ould*), or lie on her left side, as in ordinary labor. The latter position is generally adopted in this country. Whichever hand we choose to operate with, is to be well oiled or soaped, and then insinuated through the os externum edgeways. Great gentleness will be necessary, and contrary to the advice of some, it would seem better to do this during an interval of pain. When the greater part of the hand is in the vagina, it will be necessary to change its direction, from that of the axis of the lower outlet, to that of the upper outlet. This will avoid all injury to the

vagina, and will bring the points of the fingers to about the situation of the os uteri. Through the os uteri (and membranes if entire) the hand is to be insinuated very gradually, in a conical form, and during the interval of the pains; holding still, but not losing ground, when the pain comes on. When the hand is in the womb, if our object be to rectify the position of the head, it should be seized, and placed in one of the oblique diameters of the brim, with the posterior fontanelle corresponding to one of the acetabula—*i. e.* in the first or second position. If our object be to change the presentation—for example, to substitute the head for a shoulder—we must gently push up the shoulder, and then seizing the head, bring it down to the brim, and place it in the most favorable relation to the pelvis.

Having now done all that we can by the hand alone, it may be withdrawn, and the further progress of the labor left to the efforts of nature; should these be found inadequate, recourse must be had to the forceps.

This is the ordinary method of placing the head in position for descending; but Wigand has stated that it is possible, before the waters have escaped, to change the position of the head, or even the presentation, by external abdominal manipulations. Velpeau confirms this from his own experience, and something similar is stated by Sennert* and Martins.† Riecke has also related several such cases. Dr. Burns,‡ in a note to his ninth edition, states, that “Mr. Buchanan, of Hull, informs me that he succeeded in one instance lately, ‘where the left side of the breast of the fœtus lay diagonally over the pelvis, with the head forward,’ in bringing the head

* Deventer, p. 272.

† Arch. Gen. de Med. xxii, p. 385.

‡ Midwifery, p. 417.

right, by making the patient kneel and raise the breech, whilst the shoulders were brought as low as possible. The water had not been discharged. The situation of the head, when it came down, was made more favorable by the finger. The child was alive."

2. *Podalic Version*.—I shall not repeat what I have said as to the mode of introducing the hand through the os externum and os uteri. The hand and arm will be our guide, for it is better not to attempt to put it back, much less to separate it "after the manner of the ancients." "In no case is it necessary, or in any wise serviceable, to separate the arm of the child previous to the introduction of the hand of the operator. In some cases to which I have been called, in which the arm had been separated at the shoulder, I have found greater inconvenience, there being much difficulty in distinguishing between the lacerated skin of the child, and the parts appertaining to the mother. The presenting arm is never an impediment of any consequence in the operation, and therefore, in my opinion, ought not to be regarded, or on any account removed."* Arrived at this point, an examination should be made as to the position of the child's body. Having ascertained all about it, the hand is to be passed over the *front* (chest and belly) of the child, as it is generally in front that we meet with the feet. It is often a matter of difficulty to reach them, as well from the distance to be traversed, as from the contraction of the uterus. The caution of Velpeau is of great value: "Je dois aussi prevenir les jeunes praticiens, que, pour arriver au fond de l'uterus, il faut porter l'avant bras beaucoup plus profondement qu'on ne le croirait au premier abord, et que, pour se mettre en rapport avec l'axe du detroit

* Denman's Introduction to Midwifery, p. 352.

superieur, la main a besoin d'être bien plus fortement inclinée en avant, qu'on ne pourrait se l'imaginer d'après l'examen d'un bassin sec."*

This part of the operation should be slowly and gently performed—resting occasionally, and keeping the hand quite still and flat upon the body of the child during a pain, so as to avoid both injury to the mother and great pain to ourselves from the violence of the uterine contractions.

Having found one or both inferior extremities, “before we begin to extract, we must examine the limbs we hold, and be assured that we do not mistake a hand for a foot. The feet being held firmly in the hand, must then be brought with a waving motion slowly into the pelvis. While we are withdrawing the hand, the waters of the ovum flow away, and the uterus being emptied by the evacuation of these, and the extraction of the inferior extremities, we must wait till it has contracted, and on the accession of a pain, the feet must be brought lower, till they are at length cleared through the os externum.”†

The *turning* of the child is accomplished *during an interval* of pain, the feet being brought over the front of the child, and not over the back, which would risk dislocation of the spine (*Dewees*,‡ *Conquest*,§ *Gooch*||); and as the feet are drawn down, the hand will ascend.

The extraction of the child is to be accomplished gradually *during a pain*, and in drawing downwards we should be careful not to place the fœtus in a wrong position as to the

* L'Art des Accouchemens, p. 395, Ed. de Bruxelles.

† Denman's Midwifery, p. 347.

‡ Compendious System, p. 286.

§ Midwifery, p. 146.

|| Lectures, p. 235.

pelvis (*Velpeau*.)^{*} Some advise us to leave the labor to nature, after turning the child ; but to this Dewees objects : He says, “ The whole act of turning should be considered as one of necessity rather than of choice ; therefore, where it is proper to commence with it, it is we believe always proper to finish with it, and not trust the delivery to the powers of nature, after having brought the feet into the vagina, as recommended by some.”[†]

As the case is now to be managed precisely as a footling case, I shall not detain the reader upon the particulars, which may be found in all the systems of midwifery. I shall merely add, that in cases of placenta prævia, when the hand arrives at the os uteri, we have the choice of penetrating directly through the placenta, or passing the hand on one side, between it and the cervix uteri.

Throughout the operation I have spoken of bringing down *the feet* ; it is now right that I should mention some modifications of this plan.

Peu, Burton, and Wm. Hunter recommended that the hips should be seized and brought to the brim of the pelvis. The latter, in his MS. lectures, says, speaking of arm presentations : “ In this case you are to introduce the hand into the uterus, and gently put up the arm, and turn the child to a breech presentation. Reduce it if possible to a *perfect breech case*, that it may come more gradually, on account of the head and the navel string, lest you strangle the child. If, however, you find this impracticable, let it come footling, but sustain the child at the hips as long as you can, they being, next the head, the largest and most unyielding part.” ‡In Germany it

^{*} De l'Art d'Aecouchemens, p. 396. † Compendious System, p. 286.

‡ Merriman's Synopsis, p. 83, note. Kilian, Die Operative Geburtshülfe, vol. i. p. 442.

has been advocated by Schweighæuser, Schmidt, and Betschler. This plan, however, is seldom or never tried. The breech would be more difficult to seize and bring down than the head, and we should (as in cephalic version) lose all control over it, after placing it in position.

Again, it has been strongly advised to hook down the knees instead of seizing the feet, by Burton, Delpech,* and Breen. In this recommendation, Dr. Burns seems to coincide. I shall quote Dr. Breen's own statement of its advantages :

“ By this proceeding (hooking the finger in the flexure of the knee) the child would be made to revolve on the lesser axis of the trunk, and the foot would be brought into the vagina within the reach of a noose. By adopting a different procedure, and endeavouring to lay hold of a foot according to the usual directions, it is obvious that the hand of the operator must traverse a greater space of the uterus—a matter of very considerable difficulty, either when the action of that viscus is strong, or when it is closely contracted on the body of the child. This difficulty being surmounted, when the foot is laid hold on, it is very apt to slip and recede from the grasp, as well from the violence of uterine action, as from the hand being cramped and nearly powerless by reason of the previous exertion. By adhering to the direction of hooking the knee, the hand of the operator is in a great measure protected during the pains, and he is enabled deliberately to proportion the force requisite to change the position to the resistance he encounters. Besides, as the knees must have been nearly in contact with the superior part of the abdomen, from the earliest development of the extremities of the embryo, should what may be called

* Mal. Rep. Chirurg. vol. ii. p. 345, 341

accidental circumstances have removed them from this natural and usual position, but little force will be requisite to restore them to it.”*

Of course, should a foot be nearer the os uteri than a knee, Dr. Breen would advise its being seized.

These reasons certainly appear of sufficient weight to justify the admission of Dr. Breen's suggestion, as an improvement upon the previous mode of turning.

Lastly. As it is not always easy to seize both feet, we are told by many writers not to be solicitous about the second, but to extract by one alone. (*Portal*,† *Puzos*,‡ *Giffard*, *Deleurye*,§ *Wigand*, *Carus*, *Siebold*, *Kilian*.||) The reason given is simply to avoid pain to the mother, and to save the difficulty and trouble of seeking for a second. A similar recommendation has been given by my intelligent friend, Mr. Radford, of Manchester,¶ but for very different, and as far as my experience goes, for very valid reasons :

“The results of practice,” he says, “prove, what might be inferred by reasoning, that the *child's life is much more frequently preserved in those cases in which it presents the breech, than where the feet come down first.*” “Is there, then, no practice which would enable us to bring down a part, approximating in its measurements to those of the breech presentation, which we have already stated to be so safe to the child, but which cannot be effected in turning

* Edinburgh Med. and Surg. Journal, vol. xiv. p. 29.

† Pratique des Accouchemens, p. 31.

‡ Traité des Accouchemens, pp. 169, 170.

§ Ibid. p. 224.

|| Die Operative Geburtshülfe, vol. i. pp. 401, 402.

¶ Edinburgh Med. and Surg. Journal, April, 1832, p. 260, or Essays, pp. 14, 15, 16.

operations ? There is,—and this practice consists in NEVER *bringing down more than* ONE FOOT in the manual operation of turning a child.”

The following measurements were obtained from children born at the full period of utero-gestation :

The circumference of that portion of the

head which presents in labor, is from 12 to $13\frac{1}{4}$ inches.

Do. of the breech, with the thighs flexed

upon the abdomen, as in breech presentations, from

12 to $13\frac{1}{2}$ do.

Do. of the breech, *with one thigh turned*

upwards towards the abdomen, the other

extended, from 11 to $12\frac{1}{2}$ do.

Do. of the hips, the legs extended as in feet

presentation, from 10 to $11\frac{1}{2}$ do.

It is evident from these measurements, that it will be safer for the child to bring down only one foot, for inasmuch as the breech with the thigh turned up is more bulky than the hip with the legs extended, by so much will the passage be better prepared to admit the quick transit of the child's head, upon which the safety of the infant depends.

From what has been stated, it will appear that the *difficulties* of the operation are almost entirely owing to the uterus being in action. When it is quiescent, or nearly so, the operation is easy ; but when the contractions are violent, it is often tedious, difficult, and very painful, both for the patient and operator. These contractions equally impede the introduction of the hand, the finding of the feet, and the turning of the child. Once so much is accomplished, they become of valuable assistance in completing the delivery.

The *danger* to the mother may arise—1. From the operator not changing the direction of his hand, in accordance with

pelvic axes, and consequently pushing his fingers through the vagina.

2. The hand may be forced through the walls of the uterus, if too much force be used in searching for the feet.

3. The uterus may bruise itself against the hand, or the limbs of the fœtus, during the turning.*

4. Without any evident injury, the irritation of the operation may give rise to subsequent inflammation.†

5. The shock may be serious or even fatal.

The simple enumeration of these dangers ought, one would think, to go far towards obviating most of them.

The danger to the child consists—1. *In compression of the funis*, which commences about the time the buttocks appear at the os externum. (*Ould*,* *Dewees*,† *Michaelis*,‡ *Ritgen*.§) After this time, if there be much delay, the child will perish from the interrupted circulation, unless by chance the cord should have lodged in the angle at the junction of the os sacrum with the os ilium. To obviate this danger, it was proposed by Pugh|| to introduce a pipe into the child's mouth, and excite respiration, whilst the head was as yet in the vagina. Bigelow¶ and Baudelocque** are said to have employed this in practice.

2. If much extracting force be used, the spine may be dislocated; the hips also; and the leg has been pulled off.

3. Compression of the head is enumerated by Dewees†† as one of the dangers to which the fœtus is exposed.

* System of Midwifery, p. 104.

† Compendious System, etc. p. 290.

‡ See his Treatise on Version.

§ Anzeigen der Mechanischen Hülffen, 1820.

|| Treatise of Midwifery, 1754.

¶ Journal de Progrès, etc. 2d Series, vol. i. 1829.

** Revue Medicale, 1831, vol. iv. p. 505.

†† Compendious System, etc. p. 290.

It only remains now for me to say a word as to the *after treatment*. The patient will probably need an anodyne after the operation, and it is good practice to join a few grains of calomel with the opium or Dover's powder. It will be necessary to exercise great watchfulness to detect the first inroads of inflammatory action, which must be met by antiphlogistics, according to the strength of the patient, and the violence of the attack.

Careful inquiry should be made as to the character of the lochial discharge each day, and if necessary the vagina may be syringed with warm water.

The most absolute quiet and rest is desirable. If the infant be alive, the mother should not be teased with it for some hours.

ESSAY III.

ON THE VECTIS, OR LEVER.

Le Levier de Roonhuysen. Fr. Die Geburtshülffliche Hebel. G.

As an introduction to the immediate subject of this chapter, it may be advisable to make a very few general remarks upon the classes of cases requiring instrumental assistance.

Natural labor may be defined as the equable adaptation of the expulsive force, the body to be transmitted, and the passages to be traversed, the one to the other. In other words, it is necessary that the passages and the child should correspond in size, and that the uterine power should be adequate to expel the child within a given time, each stage having a certain relation to the entire duration of the labor.

A deviation from the normal proportion, in the power, (the uterine contractions) or in either of the conditions, (the passages or child) constitutes unnatural labor, (the preternatural labor of some authors,) and will demand our assistance; but the kind and degree of aid required will depend upon the amount of the relative disproportion. It is easy to see, for example, that if the passage be unusually narrow, or the head unusually large, that some mechanical contrivance will be necessary to complete the labor. This, I say, is evident, because it is simply a question of measurement.

A comparison of the diameters of the child's head with those of the pelvis, will show us what sized head can pass, and what can not ; and although in practice we cannot very easily ascertain the exact number of inches, yet as the head and the pelvic outlet are in immediate apposition, their relative sizes may be estimated without much difficulty.

In other cases, where the disproportion is much less, the difficulty may be increased, inasmuch as the question will probably be, whether, allowing for the moulding and compression of the child's head, the natural power may not be sufficient to the delivery ; or if not quite adequate alone, yet with the least possible help.

But if we turn to the class of cases where the abnormal deviation from natural labor is caused by the inefficiency of the uterine efforts, we shall find the difficulty much greater. We have no standard for ascertaining the adequacy of the pains, nor for deciding upon the necessity of interference, except that which long experience gives to individuals. Besides, the question is not merely whether the unaided efforts of nature may not, after an indefinite length of time, accomplish the delivery ; but whether the process will be completed before the constitution of the patient shall have suffered more than the ordinary shock. A patient may be delivered naturally, and yet die of the labor.

In some cases there can be no doubt ; the deficiency of uterine power, or the existence of constitutional disturbance is so marked, that prompt assistance of some kind is imperatively demanded. But in another class, these indications are less plainly marked ; the pains cannot be said to be altogether inefficient ; they might even complete the labor, if sufficient time could be allowed ; but the patient is beginning to suffer, constitutionally or locally, from the prolongation of labor ; and there are evidences that more danger may result

from delay than from interference. Now, in these cases, where the power is inefficient, or altogether deficient, we have good ground for interference, provided we possess instruments which neither injure mother nor child, and which, from their mechanical arrangements, are calculated to assist feeble pains, or to supply their absence.

For those cases where the deviation is dependent upon physical disproportion, it may be necessary that one life should be sacrificed to secure the other ; and all that can be required is, that the instruments used be accurately adapted to secure the latter, as well as to effect the former.

Thus, whether we examine the cases we meet with, and decide upon the instruments required ; or whether we classify the instruments we possess, we shall find them naturally divided into—

1st. Those which are not intended to injure either mother or child, as the *vectis* and forceps ; and

2d. Those which are employed in the destruction and extraction of the child, but which are not intended to injure the mother, as the perforator and crotchet, and the cephalotribe.

The *lever*, or *vectis*, belongs to the first of these two classes, and from its simplicity of form and operation, claims our attention first.

I confess that so many claims have been put forth to the invention of this simple instrument, that it is not very easy to trace it to its author. It has been ascribed to Celsus, to Mauriceau, to Schitling, and to Palfyn ; but the credit, so far as I can judge, belongs either to Henry Roonhuysen, or Chamberlen.* That Roonhuysen possessed the secret, there can be no question ; and among the instruments belonging to the

* Herbiniaux, Accouch. Laborieux, vol. i. p. 17.

Chamberlens, discovered at Woodham Mortimer Hall, West Malden, Essex, the vectis was found.* Mr. Cansardine, who published the account of them in vol. ix. of the *Medico-Chirurgical Transactions*, says :—

“With respect to the instruments, I would briefly observe, that they appear to me to contain within themselves the most decided and conclusive evidence of originality of invention ; and that even the progress of this invention may be distinctly traced in its different stages through the mind of the inventor. First we have a simple vectis with an open fenestrum, supposed to be of much more recent invention.” It is known that many years after Dr. Chamberlen’s visit to Paris, about the year 1693, he paid a visit to Holland, and that he there became acquainted with Roonhuysen ; but whether he communicated a knowledge of the vectis to Roonhuysen, or Roonhuysen to him, does not seem clear.† The

* In Dr. Hugh Chamberlen’s Address to the Reader, prefixed to his *Translation of Mauriceau*, 1716, after stating the custom of using hooks to bring away the child in difficult labors, he observes, “But I can neither approve of that practice, nor of those delays, (beyond twenty-four hours,) because my father, brothers, and myself (though none else in Europe as I know) have, by God’s blessing, and our industry, attained to, and long practised a way to deliver women in this case, without any prejudice to them or their infants ; though all others (being obliged, for want of such an expedient, to use the common way) do and must endanger, if not destroy, one or both with hooks. By this manual operation a labor may be despatched (in the least difficulty) with fewer pains and sooner, to the great advantage, and without danger, both of woman and child. If, therefore, the use of hooks by physicians and chirurgions be condemned, (without thereto necessitated through some monstrous birth,) we can much less approve of a mid-wife’s using them, as some here in England boast they do, which rash presumption in France would call them in question for their lives.”

† I am not quite sure that a good argument in favour of Roonhuysen’s being the discoverer, might not be drawn from the fact, that although it was known in England that the Dutch professed some marvellous means of delivering women, yet a knowledge of the use of the vectis was not communicated, as far as we know, to any one by the Chamberlens, whilst the discovery of the forceps certainly was.

majority of writers (foreigners especially) take the latter view, but some maintain the former ; I cannot undertake to decide the point.

The difference between the instruments is rather in favor of their separate invention.

It is clear, however, that each possessed the instrument and used it, and in one respect they agreed. They kept it secret, except to a chosen few, to whom it was communicated for large sums of money. Roonhuysen appears to have first taught his method to his son Roger, to Professor Ruysch and Corneille Boekelmann, and the three, on 21st March, 1709, solemnly agreed to instruct (for a consideration) Jean de Bruyn and Pierre Plattmann, providing they agreed to observe the rule of secrecy. De Bruyn practised with the vectis forty-two years, and stated that he had delivered 800 children by it. He died in January, 1753, having previously communicated the secret to Reinier Boom, who in his turn instructed Paul de Wind, and his brother, Gerard de Wind, in its use. Plattmann meantime had taught François Rooy, and Boekelmann, it is said, Monsieur de Moor.

Thus up to this period the instrument was known to nine or ten persons, but the secret was faithfully kept. The individuals gained a great profit by its possession, but the science of midwifery was not advanced. At this time (1753,) two Dutch practitioners, MM. Jacobus de Visscher, and Hugo van de Poll, whose names deserve most honorable mention, and the more especially as they did not practise midwifery, conceived the project of making public a discovery which promised such valuable results. They bought the secret for a large sum of money (Baudelocque says 5000 livres de France) of Gertrude de Bruyn, daughter of Jean de Bruyn, and wife of Herman van der Heiden, and immediately published an account of it in the Dutch language,

thus terminating the secret history of the vectis.* I have only recently obtained the essay, but many of these facts have been taken from an abstract of it translated into French by M. de Preville, and affixed to his translation of Smellie's Midwifery.

I have not been able to ascertain that the Chamberlens imparted a knowledge of the vectis to any practitioner in this country, although at the time of the publication of Visscher and Van de Poll, the forceps was ordinarily used in London. Mr. Giffard (1734) used an instrument which he calls an extractor, either as a vectis or forceps.†

Dr. Denman remarks:

“When the vectis was very much used and highly esteemed at Amsterdam, as an invaluable improvement in the practice of midwifery, the forceps was the favorite instrument in this country, especially as lastly altered by Smellie, who was then the principal teacher of the art in London. But the chief practice in this city was successively in the hands of Drs. Bamber, Griffith, Middleton, Nesbit, and Cole—some, if not all of whom, except Dr. Bamber, whose forceps I have seen, preferred the vectis to the forceps. To these gentlemen succeeded Dr. John Wathen, a man of great ingenuity and most pleasing manners, who altered the form and reduced the size of the vectis, and frequently used it with a dexterity that has astonished me. In the year 1757, that most excellent charity

* Dr. Breen, in his paper on this subject, observes: “Van de Poll settled at Canterbury in England, and assumed the name of Dawkins, but probably from his ignorance of the English language, did little to spread the knowledge of the mode of using the obstetric lever.”

There are several discrepencies between the account I have given, and that found in different authors, though not to any very great amount. I have given references to the works on the authority of which my statements are made, and as far as possible I have referred to originals.

† Cases, pp. 75, 77, 342, 351, &c.

for delivering poor women at their own habitations, was established ; and Dr. John Ford was the first physician appointed to conduct it. On every occasion which required instruments of this kind, Dr. Ford used the vectis ; and his coadjutors and successors, Drs. Cooper, Cogan, Douglass, Sims, Dennison, Squire, and Croft, with many others, have followed his example. From the deserved reputation of these gentlemen, who have at all times expressed their approbation of the vectis in preference to the forceps, many have been induced to try it, and the general opinion of its utility has increased. At the present time, all who are engaged in the practice of midwifery would consider themselves as deficient, if they were not acquainted with the structure and manner of using the vectis ; some who formerly preferred and used the forceps, have relinquished the use of this instrument for the vectis ; and others who, from education or habit, continue to use the forceps, are very willing to allow the equal, if not superior utility and convenience of the vectis.”*

It is evident that the excess of praise bestowed upon the lever has been injurious, and by exciting undue expectations, has led to disappointment—and as a consequence, to the opposite extreme of depreciation.

Amongst English writers, I find it unnoticed by Exton (1751,) Chapman (1753,) Pugh (1754,) Cooper (1766,) Johnson (1769,) Memis (1765,) Burton (1769,) Foster (1781,) and several others about the same date.

Mr. Dease of this city, whose work is dated 1783, observes of the lever of Roonhuysen : “ the instrument was applied to the occiput of the child, and against the symphysis of the pubis, by elevating the handle towards the belly of the woman, the forehead of the child was pressed down against the

* Introduction to Midwifery, 7th Ed. p. 284.

sacrum, instead of being raised from it, and the perineum must inevitably, in the greater number of cases, have been miserably lacerated." "On considering these circumstances, I was inclined to prefer and improve the lever of Roonhuysen; the form which I have given it, from repeated experience, I find answers the intention of the forceps, without being liable to the many disadvantages we meet with in using the latter."*

Dr. Osborn (1792) institutes a comparison between the forceps and lever, in which he (and justly, I think) gives the preference to the former. On the latter he makes the following remarks: "It seems extremely probable that the vectis or simple lever was employed in laborious or difficult labors before the more complicated lever or forceps was had recourse to in such cases; for, comparing the situation of the child's head in the cavity of the pelvis, with difficulties of a similar nature which must have occurred to every man's observation, such as the removing impediments of great weight with the common lever, it was hardly possible not to apply such observations to the exactly similar situation of the child in the living woman, and to endeavour to effect that relief, by those very means which were known to be effectual on inanimate matter."†

Dr. Hamilton, sen. of Edinburgh (1784) observes: "The secret of the celebrated Roonhuysen is extremely limited in its uses."‡

Dr. Bland (1794) takes the other side of the question, and in opposition to Osborn, defends the vectis, and gives it the preference over the forceps.§

* Observations in Midwifery, pp. 42, 46.

† Essays on the Practice of Midwifery, p. 116.

‡ Outlines of the Theory and Practice of Midwifery, p. 267.

§ On Human and Comparative Parturition, p. 180.

In the *Edinburgh Practice of Midwifery* (1803) we find large quotations from Dr. Denman, whose opinion, it would seem, was conclusive with the author of that compilation.

Dr. John Clarke (1808,) describes, but evidently dislikes the vectis; he concludes, "So that we either cannot use much force with the vectis, or if we do, it will be at the certainty of doing much mischief."*

Dr. Burns of Glasgow takes a very fair view of its use and value. He says, "We shall always find the lever more or less effectual, in proportion to the assistance afforded by the uterus itself, and it ought not to be employed, when we have no reason to expect the active co-operation of the pains. It should be considered more in the light of an aid to the pains than the forceps, and more dependent on them for success, consequently more limited in its utility. In this view it is a subordinate instrument, in so far as it is used in milder cases of arrest, which, perhaps, might ultimately have terminated by the natural efforts, but to which it might not have been prudent longer to have trusted. The pains may not be strong, but still they assist the instrument, and are generally excited by it to greater efficacy, otherwise we do less good."†

Dr. James Hamilton, jun., Prof. of Midwifery in Edinburgh (1826,) remarks: "The other instrument consists of a single blade, called the vectis, or lever, calculated to press on the head of the infant and to increase the efficacy of the labor pains; but as it is quite inefficacious when the uterine contractions are suspended, and as in the hands of an inexperienced practitioner it may do considerable injury, both to the infant and the parent, it should only be employed in certain cases, where there is a slight degree of narrowness at

* *London Practice of Midwifery*, 6th ed. p. 209.

† *Principles of Midwifery*, 9th ed. (1837,) p. 495.

the brim of the pelvis, or where the face of the infant is forced forward.”*

Dr. Gooch attributes little or no value to the vectis, on account of its only aiding feeble pains, and not supplying their place.†

Dr. Conquest draws a pretty accurate comparison between the forceps and vectis. “Some persons have lavished the highest praise on the one instrument, and equally eminent men have bestowed the most unqualified approbation on the other. As in most disputed points, ‘*Media quodammodo inter diversas sententias*’ will hold good here; for whilst, under some circumstances, the lever is doubtless preferable to the forceps, the latter is now very generally admitted to be, in the majority of cases, by far the most useful instrument.”‡

Dr. Ashwell (1834,) attaches but little comparative value to it.

Dr. Maunsell observes, “that either instrument (forceps or vectis) may be employed by competent persons with perfect safety.”§

In his valuable work on the Principles and Practice of Obstetricy (1834,) Dr. Blundell observes: “The next instrument, the use of which I shall mention, is the tractor, or lever, an instrument excellent and of great effect in dexterous hands. If skill and judgment are wanting, even the tractor (vectis) may inflict dreadful injuries; but in such hands, still greater mischief may be expected from the long forceps; to you, therefore, I recommend its use, as the safer instrument

* Outlines of Midwifery, p. 52.

† Lectures by Skinner, p. 215.

‡ Outlines of Midwifery, p. 103, 5th ed.

§ Dublin Practise of Midwifery, p. 134.

of the two, possessing, as it does in an eminent manner, the advantages of portability and ready application.”*

Dr. F. Ramsbotham (1834) expresses a favorable opinion of the utility of the vectis, when used as a tractor.†

In the year 1835, a distinguished practitioner of this city, Dr. Breen, published an able essay in defence of the vectis, in the Dublin Journal.‡

Having entered with sufficient minuteness into the history of the vectis in Great Britain, let us turn for a few moments to the literature of the continent.

In France, Mauriceau, before the vectis had been publicly described, invented something similar, for the purpose of extracting the head when separated from the body.

“In 1715, Isaac de Bruas, of Middleburg, made an attempt to extract a child when the head presented, with a blunt hook, such as he had been accustomed to use in breech presentations. He succeeded in his object, having slightly bruised the child’s head. Correctly judging that the instrument was too thick, and not sufficiently wide for this purpose, he formed a fenestrated vectis, decidedly the best of all those first invented, and which indeed approaches nearer than any of them to the form of Lowder’s.”§

At a later period, that is, “in 1738, Rigaudeaux being called to a case in which the head was impacted, procured a common chemist’s spatula, a foot in length, and after having softened the blade in the fire, he bent it into a slight curve, and with it delivered the woman of a live child. Incited by

* Page 509.

† Lectures on Midwifery, in Med. Gazette, May 31, 1834.

‡ Vol. vii. p. 353.

§ Ramsbotham’s Lectures, Med. Gaz. May 31, 1834, p. 307.

this success, he formed an instrument very similar to Titsing's in shape, though shorter, which he was in the habit of using continually."

"Warroquier, of Lisle, also, it would seem, fell by chance upon the expedient of delivering by the lever, before that instrument was publicly known; for in 1753, being foiled in his attempt to terminate a labor by Smellie's forceps, at that time but just come into use, he employed one blade as a vectis, and had the satisfaction of bringing into the world a living infant. From that time he discarded the double instrument, and used a single blade, not unlike Titsing's in fashion; with which indeed he afterwards boasted that in twenty-one years he had delivered 1,200 women."*

Long before this time, however, Palfyn seems to have had some idea of the instrument, if we may judge by the plate given on his authority by Heister; and as the result of his inquiries, he presented to the French Academy of Sciences, in 1720, his "tire tête."

But though these attempts were made to supply the want of the vectis, I do not find that there was any regular application of such an instrument before the publication of Visseher and Van de Poll. No writer before Levret, that I possess, alludes to it. To Levret, however, it appears to have been familiar. He places it lower than the forceps in point of utility, but recommends it when the head is on the point of being "enclavée."

About 1785, M. Herbiniaux, of Brussels, published a treatise on laborious labors, in which he appears as the advocate

* Ramsbothams's Lectures, Med. Gaz. May 31, 1834, p. 307; and also Baudelocque l'Art. des Acc. vol. ii. p. 98. Camper's Memoirs. Mem. de l'Acad. de Chir. vol. xv. p. 482.

of the vectis.* This was criticised by MM. Alphonse Le Roy and Baudelocque, and in 1791 a new edition appeared, with comments on those criticisms. It must be confessed that he does not spare his opponents, but neither do M. Baudelocque's remarks exhibit much of the milk of human kindness. The latter author concludes:—"Ce n'est pas contre l'utilité du levier mais contre l'abus qu'on en a fait, que nous nous sommes élevés : notre intention dans toutes les discussions ou nous sommes entrés, n'a pas été de le proscrire, mais de le faire voir qu'on l'avoit employé sans principes, et presque toujours en des circonstances où l'on pouvait s'en passer, où le doigt méthodiquement dirigé pouvoit suffire, ou les forces même de la nature n'avoient besoin d'aucun aide."†

M. Maygrier (1814) admits a certain though slight amount of utility ; he says : "Cet instrument, dont Roonhuysen est l'inventeur, a été beaucoup trop vanté, et comme tous les instruments nouveaux, beaucoup trop employé. Aujourd'hui, réduit à sa juste valeur, il ne sert que dans quelques cas rares, où la tête, se plaçant défavorablement au détroit supérieur, n'a besoin que d'un léger mouvement, pour pouvoir s'engager convenablement."‡

M. Deleurye§ and M. Hoin took part with Levret, and M. Chayrou opposed them.

Mad. Boivin (1817) has a very low opinion of this instrument, for she observes : "Le levier, cet instrument si long temps mystérieux chez les Hollandais, le levier lui-même, commence à tomber en desuetude malgré son apologiste Herbiniaux."||

* Vol. i. p. 17.

† L'Art des Accouch. vol. ii. p. 98.

‡ Nouv. Elem. de l'Accouch, p. 406.

§ Traité des Accouch. p. 247.

|| Memorial, p. 273.

And Mad. La Chappelle discards it altogether : “ Le levier, qui a fait tant de bruit entre les mains de Roonhuysen, est tombé maintenant dans une telle défaveur, que je crois inutile d’ajouter aux critiques qu’on en a faites.”*

M. Capuron admits that it may serve to correct a malposition of the head : “ L’unique but qu’on se propose en France avec le levier, est d’agir sur l’occiput pour l’abaisser, et pour faire remonter en meme temps le menton vers la poitrine.”† In this opinion, MM. Gardien‡ and Murat§ concur. M. Velpeau, however, seems to have formed a more correct judgment of the value and the use of the vectis.||

As it was amongst the Dutch the vectis originated, so do they appear to have estimated it most highly, and cultivated it most successfully.

In addition to the names of Henry and Roger Roonhuysen, I have already mentioned those of Ruysch, Boekelmann, De Bruyn, Plattmann, Boom, Rooy, De Moor, Visscher, and Van de Poll ; I may now add Titsing, Palfyn, Berkmann, Van der Haar, Styleke, Jans, De Bree, De Bruas, Van Geuns, Rathlauw, &c. Van Swieten, in his Commentaries upon the Aphorisms of Boerhaave,¶ published in 1754, refers to the discovery of this instrument as a benefit conferred on the human race. He remarks : “ Quamvis autem egregii viri, qui varios forcipes invenerunt, aut perfecerunt, omnem laudem

* Prat. des Accouch. p. 60.

† Principes de l’Art. des Accouch. p. 449.

‡ Traité d’Accouch. vol. ii. p. 495, 1824.

§ Dict. de Med. Art. Levier, vol. xxviii.

|| De l’Art des Accouch. p. 428, Brussels Ed.

¶ Vol. ix. p. 253 of the Ed. of 1790, in 12 vols.

mereantur, et ob industriam et ob candorem, quo sua inventa publicò communicaverunt, tamen videtur *vectis* ille *Roonhuysianus* reliquis esse præferendus.”

The celebrated Camper published a paper in 1774, in which he advocated the use of the lever, and spoke highly of its advantages.*

In 1794, Johannes Mulder published a very learned and valuable history of the forceps and *vectis*,† with measurements and plates, of which I shall avail myself in the course of this Essay.

I have already enumerated M. Herbiniaux amongst French writers, though he rather belongs to the present section, as he was a practitioner at Brussels.

The *Vectis* is also described by J. J. Plenck‡ (1781), Boer§ (1785), Gehler|| (1789), Hoffmann¶ (1766), Rechberger** (1779), Wolff†† (1774), Zeller‡‡ (1789), L. F. Froriep§§ (1832), E. Rosshirt||| (1835), H. F. Kilian¶¶ (1834).

Having thus given the history of the lever as perfectly as

* Mem. de l'Acad. de Chir. vol. xv. p. 246. Herbiniaux, vol. i. p. 57.

† Historia Literaria et Critica Forceipum et Vectium Obstetriciorum.

‡ Elementa Artis Obstetriciæ, p. 187.

§ Abhandlung von dem Gebrauche, &c. des Hebels.

|| Prog. de Vectis obstet. usu dubio.

¶ De Forcepe Smellii anteposenda Vecti Roonhuysiano.

** Bekanntmachung einer besonderen art von Hebel, &c.

†† De Vecti Roonhuysiano emendato.

‡‡ Bemerkungen über einige Gegenstände, &c.

§§ Handbuch der Geburtshülfe, p. 462.

||| De Anzeigen zu dem Geburtshülf. Operationen, p. 137.

¶¶ Die Operative Geburtshülfe, vol. ii. p. 686.

my access to books will permit, I shall next direct attention to the instrument itself. I shall give the description of M. Roonhuysen's lever first, and then noticing one or two variations, describe the one commonly in use in this country, and give the tables and plates of M. Mulder.

“ L'instrument de Roonhuisen est un morceau long et quarré de fer bien forgé, de $10\frac{3}{4}$ pouces de long et large d'un pouce : son epaisseur sans être garni est de $\frac{1}{8}$ d'un pouce, et étant garni, de $\frac{3}{8}$ d'un pouce. Ce fer est droit au milieu de la longueur de 4 pouces, et se courbe insensiblement vers les extremités. Ces courbures sont à peu près semblables, et étant mesurées dans leur concavités, elles ont 3 pouces $\frac{1}{4}$ de courbure et environ $\frac{3}{8}$ de pouce de fond. Ce levier de fer doit être soigneusement arrondi des tous cotès, et principalement aux quatre coins, afin qu'il ne puisse pas faire du mal lorsqu'on l'appuie. C'est pourquoi les extremités des courbures quoique bien arrondis, doivent être garnies d'un emplâtre de diapalme etendu sur du gros linge de la longueur d'un pouce en dedans ; le morceau droit du milieu situé entre les deux courbures, et par lequel se fait la plus forte pression contre les os pubis, doit être tout à fait garni de cet emplâtre, et un peu plus forte au milieu. Il faut surtout avoir attention que ces emplâtres soient appliqués fort egaleement sur le fer, sans le moindre pli. Apres avoir garni le fer de ces emplâtres, on le garnit tout entier de peau de chien mince et fort douce, et il faut observer que cette peau doit etre appliquée fort unie, et que le coutures de la peau soient au dehors d'est à dire du coté convexe de l'instrument.” It is added, “ Nous avons trouvé une petite corde entortillée autour d'un des bouts de l'instrument, dans l'endroit ou la courbure est plus grande, comme on le voit meme dans la figure ; ce que nous croyons ne servir à autre chose, si non pour marquer qu'on doit se servir de ce côté

plutôt que l'autre, ou pour mesurer l'approche de l'instrument."*

"I have said that Roonhuysen's lever consisted of a flat piece of iron, bent into a slight curve at both ends, and he generally employed it covered with soft leather. Titsing fancied he had improved upon this plan, by padding the instrument with wool. It has been formed by different persons—either for the sake of appearance, or from the presumption that such substances were less likely to inflict injury than the harder metal—of wood, horn, ivory, and silver. The vectis of Morand, in 1755, was of ivory; that of Herbiniaux, in 1782, of the latter material."†

"When the vectis was first known in this country, that described by Heister was preferred to those recommended by the surgeons of Amsterdam. The vectis used by Dr. Cole was like one blade of the forceps, somewhat lengthened and enlarged. That of Dr. Griffith was of the same kind, with a hinge between the handle and the blade; and that of Dr. Wathen was not unlike Palfyn's, but with a flat handle and a hook at the extremity of the handle, which prevented its slipping through the hand, and might be occasionally used as a crotchet. Many other changes have been made in the construction of the instrument, but the vectis now generally used is of the following dimensions: the whole length of the instrument before it is curved is $12\frac{1}{2}$ inches. The length of the blade before it is curved is $7\frac{1}{2}$ inches. The length of the blade when curved is $6\frac{1}{2}$ inches. The widest part of the blade is $1\frac{3}{4}$ inches. The weight of the vectis is $6\frac{1}{2}$ ounces. The handle is fixed in wood."‡

* *Memoir* translated from the Dutch, and affixed to M. de Preville's translation of Smellie, vol. iv. p. 2.

† Dr. Ramsbotham's *Lectures*, *Med. Gazette*, May 31, 1834, p. 306.

‡ Denman's *Introduction to Midwifery*, p. 286.

Dr. Bland describes one slightly different: "But the properties of the lever will be best seen by giving a cursory description of it. Unlike the forceps, it requires no great nicety in its structure. A flat piece of iron about the breadth of two fingers, from eleven to fourteen inches in length, obtuse, of sufficient strength, perfectly smooth, that it may not abrade or injure the vagina, and lightly curved at one of its extremities, gives the complete idea of a lever capable of doing every thing for which the forceps or lever are usually recommended. Upon the last circumstance, the lightness of its curve, its utility in a great measure depends; when the instrument is much curved, it is introduced with difficulty, and its action upon the head of the child is weak and inconsiderable. On the contrary, when the curve is light, just declining from a straight line, it is introduced with the greatest ease, and its power in forcing down the head of the child is very great, and may be used so as to surmount almost every possible difficulty."*

It is evident that Dr. Bland's lever can only be used as such, and not as a tractor, which is at least a disadvantage, as we shall see hereafter.

Dr. Aitkin, of Edinburgh, wishing to avoid the difficulty of introducing a curved instrument, contrived one which he called a living lever: "I have invented one, that by turning a screw, becomes straight, to facilitate its introduction. It resumes a curvature exactly proportioned to the convexity of the part of the child on which it is applied; in consequence, its pressure is more diffused, and less injurious. I have taken the liberty to call it Living Lever, because its motion resembles that of the finger."†

* Human and Comparative Parturition, p. 187.

† Principles of Midwifery, p. 73.

Dr. D. Davis has given a representation of a lever armed with small teeth, to be used in changing the position of the head.*

The one in ordinary use is that described by Dr. Lowder, and improved by Mr. Gaitskill, who says: "The vectis should be thirteen inches in length—one half to form the handle—the other the curve. The handle should be made of hard wood, rendered rough for the purpose of obtaining a firmer hold, and made to screw on and off. When the instrument is made with a hinge handle, it is very difficult to introduce: therefore this construction of the instrument should never be adopted."†

Baudelocque, speaking of the French practice, observes: "Le levier que les Français ont substitué à celui-ci, ressemble assez bien à l'une des branches du forceps de Palfyn, si ce n'est qu'il est plus étroit et plus allongé, et que sa courbure est bordée intérieurement d'un filet, semblable à celui qui règne autour les cuillers du forceps courbe de Levret. Pour le rendre plus utile, il faudrait le courber d'avantage, et lui donner la moitié de sa largeur de plus, comme quelques uns l'ont déjà proposé et fait exécuter."‡

If the reader will now take the trouble to turn to the end of the volume, he will find the chief varieties of the instrument figured in the first three plates, which I have copied from Mulder's excellent work. I do not know whether any apology is due from me for having taken so much from this laborious writer. I am sure, at least, of the thanks of my English readers for bringing under their notice, parts of a

* Elements of Operative Midwifery.

† London Med. Repository, Nov. 1823, pp. 379, 80-81. Blundell, p. 509.

‡ De l'Art des Accouch. vol. ii. p. 31, 6th Ed. 1822.

valuable work now very difficult to obtain, and I readily acknowledge my obligations to it.

I am also indebted to M. Mulder for the following tables of measurement of two classes of vectes.

The spatulæ differ from the other vectes in having broader ends, and being more curved.

VECTIUM AUC- TORES.	LAMINÆ.									
							Altitudo.			
	Longitudo.			Latitudo.			Curvaturæ Majoris.		Curvaturæ Minoris.	
	Curvaturæ.		Vectis.	Curvaturæ.		Partis Intermediæ.				
	Majoris.	Minoris.		Majoris.	Minoris.		Supra Lineam Horizont.	Infra Lineam Horizont.		
De Bruyn 1, ... Do. 2, ... Boom, Morand, Fleurant, Camper 1,..... Do. 2,..... Do. 3,..... Do. 4,..... Do. 5,..... Do. 6,..... Rechberger, ... Van Wy 1, ... Do. 2, Sleurs 1, Starke, Zeller, Bland,	$10\frac{3}{4}$ p. $10\frac{1}{4}$ p. $10\frac{1}{4}$ p. 11 p. 11 p. $10\frac{1}{2}$ p. 11 p. $10\frac{3}{4}$ p. $10\frac{1}{4}$ p. $11\frac{5}{12}$ p. $10\frac{3}{4}$ p. 11 p. $10\frac{1}{4}$ p. 13 p. $11\frac{1}{2}$ p. 11 p. $11\frac{3}{4}$ p. $13\frac{1}{4}$ p.	p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p.	4 p. $3\frac{1}{2}$ p. 5 p. 5 p. 8 p. 4 p. $5\frac{1}{4}$ p. 5 p. 5 p. 5 p. 4 p. $3\frac{3}{4}$ p. 5 p. 5 p. 5 p. 5 p. 4 p. 5 p.	p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p.	$2\frac{3}{4}$ p. $3\frac{1}{4}$ p. 4 p. $4\frac{3}{4}$ p. $7\frac{1}{2}$ p. 4 p. 5 p. $4\frac{3}{4}$ p. $4\frac{3}{4}$ p. $4\frac{1}{2}$ p. $3\frac{1}{4}$ p. $3\frac{1}{2}$ p. $4\frac{3}{4}$ p. $5\frac{1}{2}$ p. $5\frac{3}{4}$ p. $4\frac{3}{4}$ p. $4\frac{1}{4}$ p. $2\frac{3}{4}$ p.	p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p.	1 p. 1 p. 1 p. $1\frac{1}{2}$ p. $1\frac{1}{2}$ p. $1\frac{1}{6}$ p. 1 p. 1 p. 1 p. $1\frac{1}{12}$ p. $1\frac{1}{16}$ p. $1\frac{1}{2}$ p. $1\frac{1}{16}$ p. $1\frac{1}{12}$ p. $1\frac{1}{2}$ p. $1\frac{1}{6}$ p. $1\frac{1}{4}$ p. $1\frac{1}{2}$ p.	p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p. p.	1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p. 1 p.	

VECTIUM AUCTORES.	SPATULÆ.						
	Longitudo			Latitudo.		Altitudo.	
						Curvaturæ.	
	Vectis.	Curvaturæ.	Fenestræ.	Maxima Curvaturæ.	Fenestræ.	Supra Lineam Horizont.	Infra Lineam Horizont.
Titsing, ...	$10\frac{1}{2}$ p.	$5\frac{3}{4}$ p.	...	1 p.	...	$\frac{3}{4}$ p.	...
Rigaudeau, ...	$8\frac{7}{12}$ p.	$5\frac{1}{2}$ p.	...	1 p.	...	$\frac{3}{4}$ p.	...
De Bruas, ...	12 p.	$6\frac{1}{4}$ p.	...	2 p.	...	$\frac{1}{12}$ p.	$1\frac{1}{2}$ p.
Camper 7, ..	12 p.	$4\frac{1}{2}$ p.	...	1 p.	...	$\frac{3}{8}$ p.	...
Pean,	15 p.	$6\frac{1}{3}$ p.	$3\frac{1}{3}$ p.	...	...	...	...
Goubelly,	$13\frac{3}{4}$ p.	5 p.	$2\frac{2}{3}$ p.	$1\frac{1}{2}$ p.	$\frac{3}{4}$ p.	$1\frac{1}{2}$ p.	...
Baudeloëque,	$13\frac{3}{4}$ p.	$4\frac{5}{6}$ p.	$2\frac{2}{3}$ p.	$1\frac{1}{2}$ p.	$\frac{3}{4}$ p.	$1\frac{5}{12}$ p.	...
Herbiniaux,	10 p.	$2\frac{3}{4}$ p.	2 p.	1 p.	$\frac{5}{16}$ p.	$\frac{7}{12}$ p.	...
Sleurs,	$13\frac{1}{2}$ p.	4 p.	$3\frac{1}{2}$ p.	1 p.	$\frac{5}{12}$ p.	$\frac{1}{3}$ p.	$\frac{7}{12}$ p.
Lowder 1,	$12\frac{3}{4}$ p.	7 p.	$2\frac{3}{4}$ p.	$1\frac{1}{2}$ p.	1 p.	$\frac{1}{2}$ p.	$\frac{7}{12}$ p.
Do. 2,	12 p.	5 p.	$1\frac{5}{6}$ p.	$1\frac{1}{4}$ p.	$1\frac{1}{4}$ p.	$\frac{1}{2}$ p.	$1\frac{1}{2}$ p.
Do. 3,	$11\frac{3}{4}$ p.	$6\frac{1}{4}$ p.	$1\frac{5}{6}$ p.	$1\frac{1}{4}$ p.	$1\frac{1}{4}$ p.	$\frac{1}{2}$ p.	$1\frac{3}{4}$ p.
Sims,	$11\frac{1}{4}$ p.	$4\frac{1}{4}$ p.	$2\frac{5}{12}$ p.	$1\frac{5}{12}$ p.	1 p.	...	$2\frac{1}{4}$ p.
Dennison, ...	$12\frac{1}{4}$ p.	$3\frac{7}{12}$ p.	$1\frac{1}{4}$ p.	$1\frac{5}{12}$ p.	1 p.	...	$2\frac{1}{4}$ p.
Aitken,	13 p.	Varia.	6 p.	$1\frac{1}{3}$ p.	$1\frac{1}{6}$ p.	$\frac{1}{3}$ p.	Varia.
De Bree,	$11\frac{2}{3}$ p.	$5\frac{1}{2}$ p.	...	$1\frac{1}{6}$ p.	...	$\frac{3}{4}$ p.	...

The *nature of the aid* afforded by the vectis is three-fold :—

1. To correct mal-positions, or aid the natural rotations of the head at the brim, or in the cavity of the pelvis ; and to this the majority of French practitioners limit its employment.

“ It may be employed where a slight stimulus is sufficient to rouse the pains, or where little force is necessary to alter the position of the head, by introducing it in the same manner, and with the same precautions as a blade of the forceps, either at the lateral parts of the pelvis, under the arch of the pubis, or diagonally. But there is great hazard of bruising the parts of the mother by the resistance of the instrument, unless managed with so much dexterity that the

hand of the operator is the fulcrum or support upon which its action turns.”*

2. As a lever of the first or second kind—*i. e.* making a fulcrum of the pelvis, or of the left hand of the operator external to the pelvis. Its employment in the first way is extremely hazardous, from the certainty of crushing the soft structures lining the pelvis, and the probability of injuring the urethra or the child’s head. Many authorities who employ and recommend the lever, would altogether reject it, and I think justly, rather than so use it. This objection does not hold against the second mode, which is the proper one, if it be employed as a lever at all.

“The forceps,” says Dr. Osborne, “is always a lever of the first kind, but the vectis is intended to act, and may be used either as a lever of the first or of the third kind, according to the manner in which the hands of the operator are employed; for if the right hand be the moving power, and be applied to one end of the instrument, while the other end of the instrument is applied to the child’s head, and either the left hand or any of the bones of the pelvis are made the fulcrum, as they are between the two ends of the instrument, it becomes a lever of the first kind; but if the right hand of the operator is used as a fulcrum at the extremity of the instrument, and the left is applied to the middle of it, or between the two extremities, and is the moving power, it then becomes a lever of the third kind; and thus it is always meant to be employed by M. Herbiniaux, as he himself says, by the additional means of the ligature or string: and so, I believe, it is generally used here, whether with the addition of the string or without it.”†

* Dr. Hamilton, sen. Outlines of Midwifery, p. 267.

† Essays on the Practice of Midwifery, pp. 83, 84.

The discoverers and first possessors of the secret, made the arch of the pubis the fulcrum. In order to avoid the urethra, Boom, Boekelmann, and Titsing rested it upon the ramus of the ischium. (*Mulder.*)

3. *As a tractor.*—Dr. Burns says, “It is unfortunately named, for it ought not to be employed to wrench, but to hook or draw down the head; and its proper application would be less apt to be mistaken were it called the tractor.”* This can only be done with the curved vectis; with the one used by Roonhuysen no tractile power could be exerted. When the force thus used is sufficient, it is by far the safest application of the instrument.

A very high authority remarks, “The instrument then being applied in this manner, you grasp the handle with the right hand, and the middle of the shank with the left; and by the co-operation of the two, pressing down upon the cranium, you support a steady bearing upon the occiput, without, however, resting on any part of the mother as a fulcrum, for the instrument ought to be used not as a lever, but as a tractor.”†

The *cases suitable* for the employment of the vectis appear to be the following—

1. Before the head has fully entered the upper outlet, when either from slight malposition, or from very slight narrowing, the uterine efforts are ineffectual in advancing the labor.‡

“The late Dr. Bromfield, who was thought to excel in skill and address in using the forceps, a few years before his death attended a person in difficult labor; after waiting the event of the pains, until there was reason to fear some great mischief

* Principles of Midwifery, p. 494.

† Dr. Blundell, Principles and Practice of Obstetricy, p. 514.

‡ Froriep, Geburtshülfe, p. 464.

would happen to the woman if he delayed the delivery any longer, as the head of the child was not descended low enough to take hold of it with the forceps with any prospect of success, he began to think of making use of the perforator and crotchet ; but first desired the assistance of Dr. Garthshore. Dr. Garthshore, after carefully examining the position of the head of the child, agreed that it would not be proper to apply the forceps, but ventured to assure his colleague, that he had no doubt but that the woman might be delivered by the assistance of the lever ; which he accordingly proposed to use. To this proposition Dr. Bromfield at first objected, as he entertained an almost invincible aversion to that instrument ; but thinking it dangerous to delay the delivery longer, and seeing no possibility of bringing the child without opening its head, he consented that the lever should be introduced ; and from the instructions Dr. Garthshore then gave him, he was enabled to deliver the woman with it safely of a living child, in about the space of half an hour.”*

“ Now the case in which I propose to demonstrate the use of the lever, is that in which I have already been demonstrating the use of the long forceps, and which, among the laborious labours, is of all others the most common in its occurrence ; that labour, I mean, in which the cranium is detained at the brim of the pelvis, in consequence of a want of room between the front and the back.”†

“ But in another view, it is to be considered as superior (to the forceps) in so far as it may be proposed in cases midway between those admitting the use of the short, and demanding that of the long forceps. Some will say that it can be used whenever the long forceps can be employed.”‡

* Bland, on Human and Comparative Parturition, p. 192.

† Blundell's Principles and Practice of Obstetrics, p. 510.

‡ Burns' Principles of Midwifery, p. 495.

In these cases it will require a very accurate judgment, lest we use it in cases of too great narrowing, or use it with too great lever power.

Froriep advises it in cases of face presentation, and after version, when the head is difficult to extract.*

2. It was recommended by its early patrons in cases where the head had become impacted in the pelvis: in fact it was considered as superseding in a great measure the use of the crotchet. After the description I have given, I need hardly say that it is not merely powerless in such cases, but very likely to be injurious.

“By the first accounts, it appears that the vectis was recommended, not only in such cases as were thought fit and suitable for the forceps, but to supersede the necessity of our lessening the head of the child. It was, in short, asserted that no other assistance could in any case be required, beyond that which we were enabled to give with the vectis. But if those accounts were allowed to be true, they would prove the miserable state of the principles and practice of midwifery, at the time and in the country in which they were written, in much stronger terms than they would describe the excellence of the instrument.”†

Levret and some other French writers, have admitted its employment in some cases where the head was rather tight in the passage—to use their own words—on the point of being “enclavée,” but not when impacted.‡

“I presume it appears from what has been said of Roonhuysen’s lever, that from its figure, and manner in which practitioners made use of it, it must seldom be of any use in

* Geburtshülfe, p. 463.

† Denman’s Introduction to Midwifery, p. 291.

‡ Levret, Accouch. Laborieux, p. 291.

extracting the head in *difficult* labors, and that in general the frequent attempts to deliver in these cases with this instrument must be highly injurious.”*

I have hitherto deferred stating the two principal conditions of its employment, even in these cases, viz., *the presence of labor pains*, without which there could not be a chance of success ; and *the dilatation of the os uteri*.

“ You must never attempt to use the vectis when the uterus does not act ; for it is a powerless instrument, and only adapted to cases in which the pains are rather languid, than altogether deficient.” (*Gooch*.†)

3. The case which appears to me most suitable for the use of this instrument, and in which the probability of success is greatest, is that which I have sketched at the commencement of this essay, when the head having descended into the pelvic cavity, is arrested in its progress, not by any mechanical impediment, but by the inefficiency (not absence) of labor pains, and when the patient is beginning to show symptoms of constitutional or local disturbance. This condition does not take place until the second stage of labor has lasted some time, and as, after these symptoms have shown themselves, there is danger to the patient in further delay, it is important to obtain aid.

“ In this most favourable presentation,” says Dr. Breen,‡ “ the uterine action is occasionally for hours exerted in vain, from causes which we are frequently unable to account for. Much delay may excite fears for the safety of the child, and lay the foundation of a tendency to inflammation in some of the soft structures of the mother—indicated by some one, or several of the following symptoms : increased frequency, or

* Dease, Obs. in Midwifery, p. 44.

Lectures by Skinner, p. 214.

‡ Dublin Journal, vol. vii. p. 364.

fulness of the pulse ; tongue loaded in its centre ; secretion of urine diminished, and becoming higher in colour, sometimes requiring to be drawn off by the catheter ; countenance assuming an anxious aspect ; stomach irritable ; general increase of restlessness.”

Now as there is supposed to be space enough, and pains though feeble, a slight additional force will often succeed in bringing the infant into the world at once. As there is nothing in the nature of the operation to add to the danger, and especially as the tractile force will probably be sufficient, it seems peculiarly suitable to this case ; and I may add, that all the testimony I can collect is in favour of its application.

4. In cases of convulsions, or other accidents occurring during labor, provided only that the pains continue, the assistance of the lever may be sufficient to terminate the labor.

As to the *time* when the instrument may be most advantageously used, I may adopt the words of Mr. Dease : “ It requires a certain degree of cool discernment, which I believe is only acquired by long practice, to know when a woman is still capable of assisting her labor, or when the head is sufficiently low in the pelvis to use the extractor.”*

If the object desired, be to aid the head in passing through the upper outlet, or to rectify its position there, it will be well to operate so soon as the os uteri is dilated or dilatable.

When the head is in the pelvis, it is desirable to have it as low down as may be, as the operation is then much easier.

“ Under these circumstances, I think it best to examine the woman as she lies on her side : if the surgeon finds that

* Obs. in Midwifery, p. 47.

the head is sunk deep in the pelvis towards the sacrum, at least one half, he may apply the extractor: he should not form his judgment of the descent of the head from examining towards the pubis; for here, from the shallowness of the pelvis, and the swelling of the scalp, he will be very apt to be deceived, and imagine the head to be much lower down than it really is.”*

In coming to a conclusion on this point, however, regard must be had to the constitutional symptoms; if these be urgent, it would be unwise to lose time after the period at which the vectis may be easily applied.

The occurrence of any of the accidental complications, will in each case determine the period for operating, according to the urgency of the symptoms.

I regret much not having any *statistical results* to submit, but in this, as in too many other cases, practitioners seem to have concluded, that as the instrument is said to be quite safe, it was therefore useless to record the facts.

De Bruyn is said to have used it successfully 800 times in 42 years.

MM. Titsing and Berkmann used it 262 times in 24 years, and saved 80 or 90 children in the 100.†

As to the *comparative results*: the *alternative* of the vectis is the forceps, and their respective merits have been the subject of controversy with most writers who have treated of them. Upon reading over the different sides of the question, it would seem that each writer has taken up the subject too much as a partisan. To compare their utility in certain

* Dease, Observations on Midwifery, p. 49.

† Herbiniaux, Accouchemens laborieux, vol. i. pp. 65, 66.

cases, is little more than a waste of words ; as, for example, where the pains have ceased, or where compression is required to extricate the head of the child. In such cases, the vectis is of no use, and it would be highly reprehensible to employ it. But where there is room, and when the pains persist, there the vectis being sufficiently powerful, has this signal advantage, that there is but the one blade to be introduced, and but the thickness of that one blade added to the child's head. It is possible that the single blade may be able to act where the bulk of two would render extraction impossible. These appear to me to be the peculiar advantages of the vectis, and therefore I shall not detail the controversy more fully, but refer to the works of Osborn, Bland, Denman, Camper, Herbiniaux, Levret, Burns, Conquest, Ramsbotham, jun., &c. &c.

One point, however, I must notice, which has been urged in favour of the vectis, viz., the secrecy with which it may be used. Now this I consider a decided disadvantage. I most fully agree with the opinion of Dr. Osborn, and shall make no apology for transcribing it at length, as it applies forcibly to all midwifery operations :

“In the first place I am persuaded, that if concealment in the use of the means intended for relief in laborious or difficult labors be not permitted, but that the absolute necessity of such means be first established, and that every practitioner be obliged openly and avowedly to use them, we should never again hear or read of one person having used the vectis in 800 and another in 1200 cases (Van Swieten, Camper, and Herbiniaux.) Nor shall we again hear of the great number of women which some practitioners are constantly boasting of having delivered ; for no man can attend a great number of women in labor, in the manner he ought, in the way nature demands, or a conscientious discharge of his duty

requires. Nor do real difficulties occur so often, as to render it possible to believe, that any man's life could afford such numbers of difficult cases as are stated in the printed accounts from abroad. As I feel thoroughly convinced of the propriety and necessity of a fair and candid avowal of the use of instruments, in every case of midwifery where they are to be employed, so I must insist that their concealment cannot be justified by any proper motive. Such an open avowal implies a conviction in the practitioner's mind, of that irresistible necessity for their use, that supersedes every other consideration : it implies a consciousness of the rectitude of his conduct, and it implies a voluntary acceptance of the consequences of the operation, which ought to make part of his professional duty : and it clearly demonstrates to the satisfaction of the patient and her friends, that no motive of convenience to himself could urge him to an operation which may prove ruinous to his own reputation and interest. Besides, not to insist upon that responsibility from the operator, is to deprive the patient of the best and surest security against a precipitate performance of the operation. If once the practitioner can rest assured, that let the event of the case be ever so unsuccessful, the injurious effects of his operation will be buried in eternal oblivion, by blending the mischief arising from the indiscreet use of instruments with the natural consequences of labor, he will certainly have nothing to weigh against the tempting advantages of convenience or emolument to himself ; but while he is shortening the duration of the most irksome part of his professional duty, the waiting upon a slow and lingering labor, he will flatter himself that by delivering, he is doing an acceptable service to his patient, in shortening the duration of her sufferings."*

* Osborn's Essay on Midwifery, p. 144.

Method of operating.—Premising then that the case is one adapted for the vectis, that there is space enough, that the os uteri is fully dilatable, if not dilated, that there are pains,* and that the patient and her friends have been made acquainted with our intention, it next remains for us to consider the method of using the instrument ;†

1st. As a lever, and

2ndly. As a tractor.

1. *As a Lever.*—The first point to be decided is, over what part the instrument is to be applied ; and here we have latitude enough. “Some,” says Dr. Gooch, “apply it over the occiput ; others behind the ear, by which it has a bearing against the prominence of the mastoid process ; and others against the chin. The two first are perhaps the best when the head is high, as considerable force is required to move it, which may be employed with more safety against either the occiput or mastoid process than against the chin. But when the head is low down, resting on the perineum, less force will be necessary, and the vectis may then be applied against the chin ; but the instrument requires to be used with great caution, lest the jaw should be injured.”‡

“When the crown of the head presents, the fixture of the blade is generally near the situation of the mastoid process,

* Dr. Burns suggests that if the pains be weak, it may be advisable to give the Ergot of Rye before applying the instrument.—*Principles of Midwifery*, p. 495, note.

† I need hardly repeat what has been so forcibly recommended, that in all midwifery operations it is desirable to have the benefit of the advice and assistance of another practitioner. I recollect that the late distinguished Professor of Midwifery at Edinburgh, when speaking of operations, always reminded his pupils that they *might* have to defend their conduct in a court of justice, and that therefore it should always be such as would justify them before a jury of midwifery practitioners.

‡ Lectures by Skinner, p. 214.

or towards the occiput. The last has the advantage of sooner rendering the position of the head properly oblique. In face cases, the lever passes in a line from the forehead or root of the nose, its extremity resting on the occiput, between the vertex and neck, but scarcely so far back as the vertex.”*

“In employing the vectis, then, we shall find it necessary to apply it over different parts of the cranium, and perhaps the face also, successively, in order to relieve the head from its fixed situation, and favour its descent; and we may sometimes feel it necessary to use it one minute as a tractor, and the next as a lever; being, however, most cautious to *make the fulcrum of our own left hand*, as first recommended by Pean.”†

De Bruyn applied it over the mastoid process; Camper over the lower jaw; Lowder on the forehead, &c. &c.

I have already pointed out the temptation to make the soft parts of the mother the fulcrum, and the mischiefs which result. As far as my judgment extends, it would seem that the vectis ought never to be used as a lever of the first class; even as one of the second class, much caution will be necessary.

“When an instrument of this sort is used, it is proper to make the hand the fulcrum on which it acts: now if the force required is but small, this may certainly do well enough, but where great force is required, this is a very bad support; besides, the bony parts of the pelvis lie so convenient, that we may rest our instrument on any part of it. Yet we should recollect, that whatever part we convert into a fulcrum, we injure more or less, according to circumstances. If we apply

* Burns' Principles of Midwifery, p. 495.

† Rasbotham's Lectures, Medical Gazette, May 31, 1834, p. 309.

it over the symphysis pubis, we press upon the urethra ; or if in other situations, we shall injure the clitoris or vagina.”*

“The injuries inflicted indeed must have been frequent and great—and this led Pean, in 1772, to suggest the possibility of delivering by the vectis, without making a fulcrum of the mother’s structures. He proposed a practice, which is now sometimes adopted, of grasping the shank of the instrument with the left hand—the outer edge of the little finger being applied towards the vulva—making that hand the fulcrum, and pressing the extremity of the blade on the child’s head, by raising the handle firmly on the right.”†

Having determined on what part of the infant the lever is to be applied ; the instrument is to be well warmed, greased or soaped, and the patient placed in the usual position for delivery, on her left side ; the operator is to introduce one or two fingers of his left hand to serve as a director for the vectis, which is to be carefully and gently passed over the convexity of the child’s head, until it has reached the point to which the force is to be applied.

“This attained, the handle should now be held firmly with the right hand, while the index and middle finger of the left, fixed about two inches from the screw part, within the vagina, become a fulcrum. On this fulcrum or point of support, the instrument is made to move from the sacro-iliac symphysis towards the hollow of the ilium, by the action of the right hand on the handle. In this way it describes the section of a circle, and glides on to the occiput. Should the occiput point to the right ilium, the left hand must be employed ; if to the left ilium, the right hand must be used. When a

* London Practice of Midwifery, p. 208.

† Ramsbotham’s Lectures in Medical Gazette, May 31, 1834, p. 307. See also Baudelocque, vol. ii. p. 47.

pain takes place, the accoucheur should gently aid it by drawing down in the axis of the pelvis. In this way the occiput is depressed, while the chin approaches the child's breast, and the head is reduced to the smallest compass, and is thus enabled to pass through the cavity of the pelvis. As soon as the occiput is brought so low as to press on the perinæum, the instrument should be withdrawn, and re-introduced with the usual precautions. The object now in view is to place the instrument over the face of the child. To effect this, the hand must be passed up, as at first directed, to the right or left sacro-iliac symphysis, according to the situation of the face. When the instrument gets above the brim of the pelvis, a finger or two must be inserted by the side of the instrument, and pressed on till it passes over the forehead on to the face, so as to embrace the chin. The practitioner has now nothing to do but to draw down during the time of pain, increasing the power according to the degree of resistance." (*Gaitskell*.*)

Or if we prefer it, the right hand, grasping the handle, may be made the fulcrum, and the force applied by the left hand at the junction of the blade and handle, directing it downwards and backwards until the descent of the head is accomplished.

"If the instrument should slip, a fresh purchase must be obtained. As the head passes over the perineum, the efforts may be relaxed; and if the pains appear sufficient, it may be withdrawn altogether, and the termination left to nature."

2. *As a Tractor*.—The preliminary steps, introduction, &c., are the same as when it is used as a lever; but instead of making use of one hand as a fulcrum, both hands are employed in the one office of maintaining a firm purchase,

* London Medical Repository, November 1823, p. 380.

and drawing downwards and a little backwards during the pains. The effort is to be relaxed during an interval ; and this alternation of traction and rest is to be continued, until the head has descended to the inferior outlet. As before, it may be allowed to pass over the perineum without assistance, if the pains be adequate to its expulsion.*

There is, I believe, no *danger* to the mother or child when the vectis is in skilful hands, but in those of the ignorant or inexperienced, great mischief may be done.

1. It may be introduced before the os uteri is dilatable : “ of this error, contusion, laceration, and death, may be the consequences.”†

2. “ By an incautious mode of passing the instrument, the parietes of the uterus may be ruptured.”‡

3. By employing the extracting power, without bearing in mind the different axes of the pelvis, and the position of the foetal head in relation to those axes, the lever will be inefficient, and the mother injured.

4. By passing the instrument outside of the uterus instead of within its cavity, a fatal wound may be inflicted.

5. By exerting the power without regard to the pains, the operation will be in vain.

6. By making a fulcrum of the soft parts of the mother, much injury may result.

“ The lever, or vectis, is a very powerful, and consequently a very dangerous instrument, if it be used on lever principles, acting upon and injuring the soft parts of the mother, at the fulcrum or point of support. In the hands of

* See Dr. Breen's directions, Dublin Journal, vol. vii. pp. 365-6-7.

† Blundell's Principles and Practice of Obstetrics, p. 516.

‡ Gaitskell, London Medical Repository, November 1823.

men who have not employed it rather as a hook than lever, it has done incalculable mischief." (*Conquest.*)

7. By exerting too much force as the head passes over the perineum ; or neglecting to support it, you may tear the perineum, so as to lay the genital fissure open into the anus.

8. By making too much pressure with the point of the instrument upon the part of the child to which it is applied, a wound may be inflicted.

" We will now consider what circumstances may arise from use of the instrument, and first, the point of action—which is the head of the child. It is too obvious to need mentioning, that the force applied by the instrument must be equal to the resistance, if not superior to it ; and then the mischief may arise to the parts of the child's head so acted on, producing much injury. The ear may be injured : the lower jaw, or zygomatic process of the temporal bone, may be broken : or any part of the surface, from the pressure, may slough off. These evils are by no means imaginary ; there are various instances recorded of each of them, and that under the hands of the most careful and dexterous men."*

The subsequent *treatment* varies very little from that required after ordinary labor ; there is very little shock, and no injury, if the operation be skilfully performed. The parts should, however, be carefully examined, and, if necessary, a spirit lotion applied. The same treatment should be applied to the head of the child, if the instrument have bruised the integuments.

* London Practice of Midwifery, p. 208.

ESSAY IV.

ON THE FORCEPS.

Le Forceps. Fr. *Die Zange.* G.

It will be at once admitted, I believe, that the greatest triumph of surgery is to diminish the frequency of operations, and to substitute those of minor severity and danger, for others involving more serious risk. If this be true, then it must be granted that the invention of the forceps, and their employment in practice, is the greatest improvement recorded in the annals of operative midwifery. Before the introduction of this instrument, the only extracting force at command was obtained by the insertion of a hook into the head of the child—such as is now used in the operation of craniotomy.*

This proceeding must of course have been fatal to the child

* The hook was at first applied to the extraction of dead children only; Guillemeau was the first, I believe, who suggested that it might be used with a living child, if the ease were such as that both mother and child would perish, unless the child were sacrificed; but after all, it was only a question of time, for the person who scrupled to use it with a living child, had no scruple about waiting till it died, and then using it.

in an immense majority of cases, and the very few who were born alive, must have been subsequently endangered by the mutilating process employed in the delivery. But this was not all ; every man possessing common feelings of humanity must have shrunk from the painful necessity of such a proceeding, and have deferred the operation as long as possible, by which the danger to the mother was greatly increased.

Now from this double risk, and fearful mortality, we have been relieved by the invention of the forceps, for although we are still obliged to destroy the child occasionally, to secure the safety of the mother, yet this class of cases is incomparably smaller than that in which, by the timely application of the forceps, both the child and mother escape injury.

For these reasons, I conceive that I am justified in stating that the invention and employment of this instrument is the greatest improvement that has ever occurred in midwifery, even though I may not go the length of certain of its advocates, in asserting that it is entirely without danger to the mother or her infant.

It cannot be said that the ancients were altogether ignorant of this method of extracting the infant, although it does not appear to have been generally known. Mulder, in his valuable work, gives the following extract from a translation of the works of Avicenna : “ *Oportet ut inveniat obstetrix possibilitatem hujusmodi fœtus, quare subtilietur in extractione ejus paulatim ; tunc si valet illud in eo, bene est ; et si non liget eum cum margine panni et trahat cum subtilitur valde cum quibusdam attractionibus. Quod si illud non confert administrentur forcipes, et attrahatur cum eis ; si vero non confert illud extrahatur cum incisione, secundum quod facile fit, et regatur regimine fœtus mortui.* ”*

* Mulder, *Historia Forcipum et Vectium*, p. 6. “ With regard to the fillets

This very distinct allusion to the forceps seems to have made no impression, for we find no similar attempt to extract the child until the middle of the 16th century; at which time (1554) Rueff recommended an instrument resembling a pair of lithotomy forceps, for the purpose of extracting dead children, or of supplying a deficiency of manual force. It does not appear, however, that he appreciated the value of the forceps as subsequently employed, nor did his contemporaries carry out his suggestion, for it was not until a century later that the instrument was brought into practice.

Before the time of the Chamberlens, it was unknown in England, and even at the time Dr. Hugh Chamberlen published his translation of Mauriceau, in 1672, it was still a secret. No allusion to such an instrument is to be found in Raynalde's work (1634,) nor in the translations of Portal (1705,) Deventer (1716,) or La Motte (1745.)

In his preface to the translation of Mauriceau, to which I have referred, Dr. Hugh Chamberlen, after mentioning the method of extracting the child by hooks, observed: "But I can neither approve of that practice, nor of those delays, beyond twenty-four hours, because my father, brother, and myself, (though none else in Europe, as I know,) have, by God's blessing, and our industry, attained to, and long practised a way to deliver women in this case without any prejudice to them or their infants; though all others (being obliged, for want of such an expedient, to use the common way,) do and must endanger, if not destroy, one or both, with

and forceps, they have been alleged to be late inventions; yet we find *Avicenna* recommending the use of both. The forceps recommended by *Avicenna* is plainly intended to save the *fetus*, for he says if it cannot be extracted by this instrument, the head must be opened, and the same method used which he describes in his chapter on the delivery of dead children."—*Smellie's Treatise on Midwifery*, vol. i. p. 40.

hooks. By this manual operation, a labor may be despatched (in the least difficulty) with fewer pains and sooner, to the great advantage and without danger, both of woman and child; if, therefore, the use of hooks by physicians and chirurgeons be condemned, (without thereto necessitated through some monstrous birth,) we can much less approve of a midwife using them, as some here in England boast they do, which rash presumption in France, would call them in question for their lives."

This extract, however, does not fix the date of the invention by Dr. Chamberlen, nor have we any very accurate data for doing so. Through the kindness of my friend, Dr. Aquila Smith, I possess a portrait of Dr. Paul Chamberlen, (the father); the date is 1658; it represents a man beyond the middle age, and it may reasonably be supposed that the publication of this print arose from the notoriety he had acquired by his secret for delivering women without injury. This would fix the date of the discovery before 1658. Of his sons, Drs. Peter and Hugh Chamberlen are the only ones whose names are familiar to us.

From some inaccuracy of expression in the extract I have quoted from Dr. Hugh Chamberlen's preface, it was even doubted whether the instrument alluded to was the forceps, but that doubt has been set at rest by Mr. Cansardine, who has published an account of the discovery of Chamberlen's own instruments.

"The estate of Woodham Mortimer Hall, near Maldon, in Essex, was purchased by Dr. Peter Chamberlen, some time previous to 1683, and continued in his family till about 1715, when it was sold by Hope Chamberlen to William Alexander, wine merchant, &c."

In an old chest, found in one of the chambers of this house, certain obstetric instruments were discovered, along

with "old coins, trinkets, gloves, fans, spectacles, &c.," and were presented to Mr. Cansardine, who thus describes them: "First, we have a simple vectis, with an open fenestrum; then we have the idea of uniting two of these instruments by a joint, which makes each blade seem as a fulcrum to the other, instead of making a fulcrum of the soft parts of the mother; and which also unites a power of drawing the head forward. This idea is at first by a pivot, which being riveted, makes the instrument totally incapable of application. Then he goes to work again, and having made a notch in each vectis for the joint, he fixes a pivot in *one only*, which projecting, is to be received into a corresponding hole in the other blade, after they have been applied *separately*. It may be observed, that although there is a worm to the projecting part of the pivot, yet there is no corresponding female screw in the hole which is to receive it. Every practical accoucheur will know, that it is not easy, or always possible, to lock the joint of the forceps with such accuracy as to bring this pivot and hole into opposite contact. This Chamberlen soon discovered, and *next* produced a more light and manageable instrument, which instead of uniting by a pivot, he passes a *tape* through the two holes, and winds it round the joint, which method combines sufficient accuracy of contact, security, and mobility."*

There can now be no doubt of the credit of the invention being due to Dr. Paul Chamberlen, and I think I have shown that there is presumptive proof, that it took place before the year 1654. The secret was, however, carefully preserved, nor had it been communicated in the year 1716, for in Dr. Hugh Chamberlen's 3d Ed. of Mauriceau, published in that year, the passage I have quoted is continued in the preface.

* Mr. Cansardine's paper in Med. Chir. Trans. vol. ix. p. 183.

About this time, or soon after, the secret appears to have been communicated to one or two, for Dr. R. W. Johnson,* when speaking of the forceps, says: “besides these, I have a pair of forceps, which did belong to the late Mr. Drinkwater, (late Surgeon and Man-midwife at Brentford,) who began practice in 1668, and died in 1728. The size and form of this pair agree with those of Chapman and Giffard, save only that the hooks of the handle are turned outwards.”

And Mr. Chapman, in 1733,† published a description and a plate of the instrument—(*Pl. 5, Fig. 1, 2*)—which he had used from the year 1726, stating it to be the instrument used by the Chamberlens; but without stating whence he procured it. I have not succeeded in discovering from whom he received it, though from his not claiming the merit of the invention, it is evident that it was communicated to him. He has, however, the great credit of being the first in these countries who published an account of it for the benefit of the profession.

Mr. Giffard, 1734, used an instrument which he called an extractor, either as a vectis (with one blade,) or forceps (with both blades—(*Pl. 4, Fig. 8, 9.*) Speaking of a case where the head was lodged upon the pubis, he says, “I passed it (the extractor) up on one side, and on the other I passed the other cheek of my extractor. When I had fixed them, and brought them as close together as I well could, I drew strongly forwards, by which I found the head advance, and its crown appear without the labia pudendi, and in a short time I brought out the whole head, which was very large, &c.”‡

Sir Fielding Ould, 1742, describes the long forceps with

* A new and improved System of Midwifery, p. 170.

† A Treatise on the Improvement of Midwifery, &c.

‡ Cases in Midwifery, p. 79.

the centre screw, like Chamberlen's, and recommends its being applied laterally. "By the above method," he adds, "the child is often brought forth alive, nay, it is my opinion, that with a strict observance of every particular of the above precautions, how trifling soever some of them may appear, that the infant will never be destroyed by this instrument."*

Dr. Burton, 1751, recommended the forceps, and described an improved one, but it did not differ much from those previously in use. (*Pl. 6, Fig. 6, 7, 8, 9.*) He objects to covering the blades with leather, and clearly points out certain cases to which the instrument is not applicable.†

Dr. Brudenell Exton, 1751, thinks less of the forceps than his master, Chapman, and limits their use to cases where the head is very low in the vagina. He substitutes assistance with the hand in most cases.‡

In 1752, Dr. Smellie's work appeared ; his natural talent and great power of observation, aided by great experience, have obtained for him greater estimation than any of his predecessors, and his work will long continue on many points a standard authority. He shortened the forceps, and, except in a few cases, rejected the second curvature. (*Pl. 7, Fig. 1, 2, 3, 4.*) He also attended more minutely to the mechanism of extraction. He remarks : "For my own part, finding in practice that by the directions of Chapman, Giffard, and Gregoire at Paris, I frequently could not move the head along without contusing it, and tearing the parts of the woman ; for they direct us to

* Treatise on Midwifery, &c. p. 156, Dublin.

† New and Complete System of Midwifery, p. 213.

‡ New and General System of Midwifery.

introduce the blades of the forceps where they will easiest pass, and taking hold of the head in any part of it, to extract with more or less force, according to the resistance; I began to consider the whole in a mechanical view, and to reduce the extraction of the child to the rules of moving bodies in different directions: in consequence of this plan, I more accurately surveyed the dimensions and form of the pelvis, together with the figure of the child's head, and the manner in which it passed along in natural labor; and from the knowledge of these things, I not only delivered with greater ease and safety than before, but also had the satisfaction to find in teaching, that I could convey a more distinct idea of the art in this mechanical light than in any other; and particularly give more sure and solid directions for applying the forceps, and to the conviction of many old practitioners, when they reflected on the uncertainty attending the old method of application."*

Mr. Pugh, 1754, appears to have been one of the first who added the second curve at the end of the blades to correspond with the axes of the pelvis, and enable the operator to act upon the head when high up in the pelvis. (*Pl. 7, Fig. 5, 6, 7, 8.*) He preferred the long forceps, and applied them over the parietal bones.†

Dr. Memis, of Aberdeen, 1765, treats of the application of the forceps when the head is arrested in the pelvis, and the pains ineffectual for the delivery.‡

Mr. Cooper, 1766, treats concisely and carefully of the

* Treatise on the Theory and Practice of Midwifery, vol. i. p. 1557, 6th Edition.

† Treatise on Midwifery, p. 82.

‡ Midwife's Pocket Companion, p. 93.

mode of applying the forceps, and specifies the cases in which the instrument may be used.*

In 1760, Dr. R. W. Johnson published his treatise on midwifery,† in which he proposes an improvement upon the forceps then in use ; the principal advantages of which consist in the blades being thinner and rather broader. (*Pl. 7, Fig. 9, 10.*) They have also the second curvature, as recommended by Pugh.

Dr. Hamilton, sen., of Edinburgh, published his work in 1775, and described the various circumstances calling for the use of the forceps. Successive editions contained fuller information on the subject.‡

Dr. Moor, 1777, gives very short, but clear, directions for applying the forceps, though he does not specify the cases in which they may be most advantageously used.§

In the year 1781, Dr. Sims edited Dr. Foster's (of Dublin) Lectures, in which the short forceps is described. His view of the utility of the forceps is rather limited : he applied them obliquely, and only when the head had descended into the pelvic cavity.||

Mr. Perfect published his cases in 1782-3.¶ He used the forceps when the forehead was towards the pubis ; in face presentations ; when the chin was towards one side of the pelvis ; in narrow lower outlet ; distorted pelvis ; when the head was detained in the vagina ; in neck presentations, &c. He employed both the long and short forceps.

* A Compendium of Midwifery, p. 122, et seq.

† A new System of Midwifery, &c., 1769.

‡ Elements of the Practice of Midwifery.

§ Elements of Midwifery, p. 93.

|| Principles and Practice of Midwifery, &c., p. 150.

¶ Cases in Midwifery, 2 vols.

Dr. Osborne, 1783, published a very valuable essay on Laborious Labors, containing a defence of the forceps against the accusations of those who preferred the vectis. He appears, however, to over-estimate the powers of the instrument, when he states, "I am not afraid of asserting, that, if applied with ordinary skill and attention, it is infallible in its effects, in every possible degree of difficulty, from the slightest to the greatest, if the child's head is only in such a position as to be within reach of the instrument."* (*Pl. 10, Fig. 1, 2.*)

Dr. Spence, in 1784, described the successive improvements in the forceps, and laid down rules for their application. He prefers the forceps with the second curve.†

In 1782, Dr. Leake published a description of a pair of forceps with three blades, invented by him. (*Pl. 7, Fig. 11, 12, 13.*) He intended it for those cases in which the occiput of the child catches on the symphysis pubis, in consequence of the head presenting with its long diameter corresponding to the antero-posterior diameter of the upper outlet. In this case, the ordinary forceps, applied laterally, would rather increase the evil, which may be remedied, he thinks, by passing up a third blade in front, to act as a lever.‡ I do not know that it has been used since his time.

Mr. Dease, 1783, prefers the form of Levret's forceps, but objects to their ever being applied when the head is at the brim, or just entering the pelvis. With these exceptions, he concludes, "that the forceps, prudently applied, is an instrument which, in good hands, may safely effect delivery in

* Essays on the Practice of Midwifery, p. 88, 2d Ed.

† A System of Midwifery, vol. i. p. 185.

‡ Introductory Lecture, p. 108.

different labors, is what every practitioner must have been repeatedly convinced of, as also that it has many disadvantages.”*

Dr. Aitken, 1784, applied his peculiar mechanical taste to the modification of the forceps, but it will probably be admitted, without success. He says, “I have added a screw to the handles, by which the closing is prevented, so that the head is protected. I have improved the manner of locking or connecting the blades, so as to prevent the possibility of catching and wounding the mother’s parts, or bruising the child. I have likewise constructed this instrument on the principle of the *living lever*, and of course named it *living forceps*—an improvement in many situations highly important.”† (*Pl. 9, Fig. 3, 4, 5.*)

The publication of Denman’s Aphorisms, 1786, and his Essays on Difficult Labors, 1787, gave a more definitive form to the information already possessed upon instrumental deliveries, and added new rules. (*Pl. 10, Fig. 3, 4.*)

Since the time of Denman, every writer has described the forceps, and laid down rules for their use. The reader may consult, with advantage, the works of Dr. John Clarke,‡ Dr. Burns,§ Dr. Merriman,|| Dr. Dewees,¶ Dr. Conquest,** Dr. Gooch,†† Dr. Campbell,‡‡ Dr. Davis,§§ Dr. Ryan,|||

* Observations in Midwifery, p. 40.

† Principles of Midwifery, p. 74.

‡ London Practise of Midwifery, p. 209.

§ Principles of Midwifery, p. 463.

|| Synopsis of Difficult Parturition, p. 163.

¶ Compendious System of Midwifery, &c. p. 296.

** Outlines of Midwifery, pp. 96, 111.

†† Lectures by Skinner, p. 201.

‡‡ Introduction to Midwifery, p. 230.

§§ Operative Midwifery.

||| Manual of Midwifery, p. 543.

Dr. Ramsbotham,* Dr. Blundell,† Dr. Ashwell,‡ Dr. F. Ramsbotham,§ Dr. Maunsell,|| Dr. Collins,¶ Dr. Hamilton,** Dr. Meigs,†† &c. &c.

There is some doubt as to the accoucheur who first employed the forceps in France. When Palfyn promulgated his discovery (1720), after the visit of Chamberlen to Holland, Gillies Le Doux, of Ypres, claimed the invention as his own;‡‡ but that Palfyn was indebted to him for the secret, we do not know.

One of the first persons who employed the forceps was M. Duse, 1733. A description of his instrument was published by Dr. Butler, of Edinburgh. §§ (*Pl. 4, Fig. 7.*)

In the year 1741, Jacques Mesnard published an account of a new instrument, which he calls “tenettes à cuiller,” in the *Journal de Verdun*, and repeated the description, with a plate, in his “*Guide des Accoucheurs*,” 1743. The handles of these forceps did not cross, but were joined by a screw. He also invented a pair of “tenettes à crochet.” (*Pl. 5, Fig. 8.*)

Gregoire, jun., 1746, employed a pair of forceps, which have been described by Boehmer. |||| (*Pl. 5, Fig. 9, 10.*)

* Pract. Observations in Midwifery, p. 252.

† Principles and Practice of Obstetricky, p. 501.

‡ On Parturition, p. 458.

§ Lond. Med. Gazette, 1833-34.

|| Dublin Practice of Midwifery, p. 129.

¶ Pract. Treatise on Midwifery, p. 10.

** Pract. Observations, vol. ii. p. 93.

†† Pract. of Midwifery, p. 286. Philadelphia, U.S. 1838.

‡‡ Le Roy Prat. des Accouch, p. 82.

§§ Ed. Med. Essays, vol. iii. Pl. 4, Fig. 7.

|||| Essay, De Usu et Præsentia Forcipis Anglicanae, &c. &c. 1746.

In 1747, Levret published his valuable work, “Observations sur les Causes et les Accidens de plusieurs Accouchemens laborieux,” in which he described the long forceps (with plates) which is still in use in France, and bears his name. (*Pl.* 11, *Fig.* 1, 2, 3, 4, 5.) He also invented an instrument very like Leake’s forceps, for the purpose of extracting the head when separated from the body, and left in the uterus.

Astruc, in his “Art d’Accoucher,” (1766,) speaks of the forceps as the perfection of operative midwifery, and Deleurye, (1770,) in his “Traité des Accouchemens,” as the invention by which midwifery was civilized.

In 1788, Coutouly presented to the Academie Royale de Chirurgie, a new species of forceps, the blades of which did not cross, and which was so arranged as to make a graduated pressure upon the head of the child. (*Mulder*.*)

Du Fot, 1775, in his “Principes sur l’Art d’Accouchemens,” recommends the forceps in “enclavement” of the head.

In the year 1771, Burton’s work was translated by M. Le Moine, and Smellie’s by M. de Preville, which placed at their command all that was known at that time in this country on the subject of the forceps.

M. Herbiniaux published his “Traité sur divers Accouchemens laborieux” about 1785, in which he defends the lever against the forceps, and attacks Levret; but Levret’s authority prevailed with his countrymen, and the forceps became the favourite instrument. It has been since slightly modified by several persons, and recommended by Saccombe,† Maygrier,‡

* *Historia Forcipum*, p. 77.

† *Elemens de la Science des Accouch.* p. 274.

‡ *Nouv. Elemens de la Science et de l’Art des Accouch.* 1814, p. 393.

Bandelocque,* Boivin,† Lachappelle,‡ Flamant,§ Capuron,|| Gardien,¶ Velpeau,** Moreau, &c.

We have already noticed the recommendation of a species of forceps by Rueff, in 1554. More than a century elapsed before any attempt was made in Germany to employ such an instrument in practice.

About the year 1673, Cornelius Van Solingen (according to Haller) fabricated a pair of forceps for the purpose of extracting the fœtus.†† He was followed by Slevogt‡‡ in 1709, and Palfyn in 1720. (*Pl. 4, Fig. 2, 3, 4, 5.*) Palfyn visited France and England, and it is possible that he may have obtained his information about the forceps from this country. It has already been stated that his supposed invention was claimed by Gillies Le Doux, of Ypres.

In 1747, Velsen and Rathlauw settled at Amsterdam, and professed to have an instrument (the forceps, *Pl. 6, Fig. 1, 2,*) by which women could be delivered, but they were not allowed to remain, because of a law which prohibited any one from practising midwifery there, who did not know the secret of Roonhuysen.

In 1747, Schlichting published a plate of a pair of forceps §§

* L'Art des Accouchemens, &c., vol. ii. p. 133, 6th Ed.

† Memorial, 1817, p. 275, 2d Ed.

‡ Pratique des Accouchemens.

§ Mem. Pratique sur le Forceps. Strasburgh, 1816.

|| Cours d'Accouchemens, p. 452, 4th Ed.

¶ Traité Complet d'Accouchemens, vol. ii. p. 507.

** Traité Complet des Accouchemens, p. 415, Ed. Brussels.

†† Mulder's Historia Forcipum, &c. p. 13.

‡‡ De Instrumentis Hippocratis Chirurgicis, &c. Jena, 1709.

§§ In Embryulcia nova detecta, &c.

which he saw in possession of Uvens, who received them from Broderode, a disciple of Ruysch.

In 1750, J. E. Janck described Bing's forceps.

In 1755, P. De Wind, "*ex præcepto Chapmanni*," published an account of the forceps he used, which were of different lengths, and so arranged that they required but one hand to use them. (*Pl. 6, Fig. 10, 11.*)

In 1770, J. F. Henckel published his "*Abhandlung von der Geburtshülfe*," in which he treats at some length of the forceps.

G. A. Freid, 1770, in his lectures, recommended Levret's forceps, and used them in private practice. His pupil, Emmanuel Fries, in 1771, described an instrument differing somewhat from the forceps of Levret.

J. C. Gehler, in 1710, advocated the forceps used by Johnson in preference to that of Levret.

In 1777, Van der Laar used a pair of forceps resembling two vectes in the curvature of their blades, and a similar pair was described by Sleurs in 1783. (*Pl. 8, Fig. 2, 3, 4, 5.*)

Starke and Mayer in 1785, and Saxtorph in 1791, likewise published descriptions of the alterations or improvements made by them. (*Pl. 9, Fig. 6, 7, 8, 9.*)

In 1795, J. Mulder published his "*Historia literaria et critica Forcipum et Vectium*," one of the most learned and valuable works that has ever appeared on this branch of midwifery. To his work I am indebted for many of the foregoing details in the history of the forceps, and for the measurements and plates which follow.

Since his time I find the use of the instrument explained and recommended by Spiering* (1801,) Saxtorph† (1803,)

* Die praktische Geburtshülfe, p. 273.

† Gesammelte Schriften, &c. p. 270.

Stein (1809,) Steidelè* (1813,) Ritgen† (1820,) Froriep,‡
 Siebold,§ Osiander,|| Carus,¶ Joerg,** Cohnstein,††
 Busch,‡‡ Rosshirt,§§ Kilian,||| &c.

Having given this brief sketch of the history of the forceps, I shall next quote the different measurements given by Mulder, and then allude to the principal peculiarities of the variations and improvements which have been proposed.

* Abhandlung von der Geburtshülfe, vol. iv. p. 9.

† Anzeigen der Mechan. Hülfen bei Entbindungen, &c. p. 328.

‡ Handbuch der Geburtshülfe, p. 437.

§ Lehrbuch der Geburtshülfe, p. 301.

|| Die Ursachen und Hülfsanzeigen der Geburten, &c. p. 245.

¶ Lehrbuch der Gynæcologie, vol. ii. p. 318.

** Handbuch der Geburtshülfe, p. 469.

†† Handbuch der Geburtshülfe, p. 342.

‡‡ Lehrbuch der Geburtskunde, p. 602.

§§ De Anzeigen zu den Geburtshülfflichen Operationen.

||| Die Operative Geburtshülfe, p. 544.

TABLE 1.—DIMENSIONS OF FORCEPS IN USE FROM 1554 TO 1769.

Foreipum Auctores.	Longitudo.			Distantia.						Cochlearium ad apicem.	Latitudo maxima Cochlearium.	Dist. latitudi- nis maxime Cochl. et apicis.	Longitudo fenestrarum.	Apertura fenestrarum maxima.
	Forcipis.	Cochlea- rium.	Manubrio- rum.	Angulus quo divergunt Cochlearia.	Apicis Coch- lear. et loci gunt.	Cochlearium intermedia maxima.	Loci Coch- lear. maxime distantis et apicis.							
Rueff.....	11 poll.	5 $\frac{5}{12}$ poll.	4 $\frac{7}{12}$	...	5 poll.	3 poll.	...	...	...	...	...	...	...	...
Palfyn, 1, ...	14	9	5	80°	6	3 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Palfyn, 2, ...	15	10 $\frac{1}{2}$	4 $\frac{1}{2}$	14°	5 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Ineerti, ...	15	8	6 $\frac{1}{2}$	36°	5	4	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Duse, ...	16	10 $\frac{1}{2}$	5 $\frac{1}{2}$	34°	7 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	...	...	...	...	...	...	...
Giffard, ...	12 $\frac{1}{2}$	7	5 $\frac{1}{2}$	40°	6 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	...	...	...	...	...	...	...
Freke, ...	12	6 $\frac{1}{2}$	5 $\frac{1}{2}$	34°	5	2 $\frac{1}{2}$	1 $\frac{1}{2}$	...	...	...	...	...	...	...
Chapman, ...	15	9	5 $\frac{1}{2}$	22°	9	2 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Mesnard, ...	12	3 $\frac{1}{2}$	3 $\frac{1}{2}$	40°	5	2 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Gregoire, ...	15	8	6 $\frac{1}{2}$	34°	7	3 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Rathlauw, 1,	13 $\frac{1}{2}$	7	8 $\frac{1}{2}$	46°	6 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Rathlauw, 2,	15 $\frac{1}{2}$	7	7 $\frac{1}{2}$	52°	6 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Schlichting, ...	13 $\frac{1}{2}$	6	7 $\frac{1}{2}$	80°	8 $\frac{1}{2}$	4 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Levret, 1, ...	18	9 $\frac{1}{2}$	8 $\frac{1}{2}$	10°	8 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Levret, 2, ...	16 $\frac{1}{2}$	9 $\frac{1}{2}$	6 $\frac{1}{2}$	14°	8 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	...	...	...	...	...	...	...
Bing, ...	18 $\frac{1}{2}$	9 $\frac{1}{2}$	8 $\frac{1}{2}$	24°	8	3 $\frac{1}{2}$	3 $\frac{1}{2}$	...	...	...	...	...	...	...
Levret, 3, ...	15 $\frac{1}{2}$	8 $\frac{1}{2}$	7	18°	7 $\frac{1}{2}$	2	2	...	...	...	...	...	...	...
Burton, ...	11 $\frac{1}{2}$	3 $\frac{1}{2}$	7 $\frac{1}{2}$	varius,	7 $\frac{1}{2}$	2	2	...	...	...	...	...	...	...
De Wind, ...	9 $\frac{1}{2}$	2	4 $\frac{1}{2}$	20°	7 $\frac{1}{2}$	1 $\frac{1}{2}$	4 $\frac{1}{2}$	...	...	...	...	...	...	...
Smellie, 1, ...	11	6 $\frac{1}{2}$	4 $\frac{1}{2}$	80°	6	2	3 $\frac{1}{2}$	...	...	...	...	...	...	...
Smellie, 2, ...	12 $\frac{1}{2}$	7 $\frac{1}{2}$	4 $\frac{1}{2}$	54°	7	2	3 $\frac{1}{2}$	...	...	...	...	...	...	...
Pugh, 1, ...	11	7 $\frac{1}{2}$	3 $\frac{1}{2}$	18°	7 $\frac{1}{2}$	2 $\frac{1}{2}$	3	...	...	...	...	...	...	...
Pugh, 2, ...	14	8	5 $\frac{1}{2}$	46°	7 $\frac{1}{2}$	2 $\frac{1}{2}$	3	...	...	...	...	...	...	...
Johnson, ...	11	6 $\frac{1}{2}$	4 $\frac{1}{2}$	60°	6	2 $\frac{1}{2}$	3 $\frac{1}{2}$	...	...	...	...	...	...	...

TABLE II.—DIMENSIONS OF FORCEPS IN USE FROM 1771 TILL 1793.

Forcipum Auctores.	Longitudo.			Distantia.							Longitudo.		
	Forcipsis.	Cochlearium.	Manubrio- rum.	Angulus quo divergunt.	Cochlearia. divergunt.	Apicis Coch. et loci quo divergunt.	Cochlearium intermedia maxima.	Loco! Cochl. maximè dis- tans et apli- cis.	Cochlearium ad apicem.	Latitudo maxima cochlearium.	Dist. latitu- dinis maxime cochl. et apicis.	Longitudo fenestrarum.	Apertura fenestrarum maxima.
Friedl,	15½ poll.	8½ poll.	7 poll.	18°	7½ poll.	7½ poll.	2 poll.	3 poll.	...	1½ poll.	1½ poll.	9 poll.	3 poll.
Leake,	13	7½	5½	60°	7½	7½	2½	3	1½ poll.	1½	1	4½	3
Petit,	15	8½	6½	34°	7	6	2	3½	1½	1½	1	5½	3
V. der Laar, 1,	12½	7½	4½	44°	6½	6½	2	3½	...	1½	1½	5½	3
V. der Laar, 2,	12½	8½	4½	36°	7	7	2½	3½	...	1½	2	6½	3
Coutouly, 1,	16½	9½	7	20°	8½	8½	2½	4	...	1½	2½	7	3
Pean,	17½	10	7½	30°	9	9	2½	4	...	1½	2½	7	3
Sleurs,	13½	8	4½	16°	7½	7½	2	1½	1	1½	1½	3½	3
Orme,	10½	5½	4½	85°	5	5	2½	3½	...	1½	3½	4½	3
Lowder,	11½	6½	4½	83°	6	6	2½	3½	...	1½	4	4½	3
Young,	11½	6½	4½	79°	6½	6½	2½	3½	...	1½	4	4½	3
Evans,	11½	7½	4½	46°	5½	5½	2½	3½	...	1½	4	4½	3
Aitkin, 1, ...	11½	7½	4½	84°	6½	6½	3	3	1½	1½	1½	4½	3
Aitkin, 2, ...	11½	7½	4½	54°	6	6	3	3	...	1½	1½	4½	3
Aitkin, 3, ...	10½	7½	3½	52°	5½	5½	3	3	...	1½	1½	4½	3
Mayer,	16½	9½	7	18°	7½	7½	2½	3	...	1½	1½	6	3
Starke,	12½	8½	4½	35°	6½	6½	2½	3	...	1½	1½	4	3
Coutouly, 2,	15½	10½	5½	...	...	...	1½	...	...	1½	...	...	...
Coutouly, 3,	15	9½	5½	...	...	...	1½	...	...	1½	...	...	...
Saxtorph, ...	12	6½	5½	26°	6½	6½	3	1½	3½	1½	1½	4½	3
Osborne,	11½	6½	4½	75°	6	6	2½	3½	1½	1½	1½	4½	3
Rawlins,	10½	6½	4	48°	5½	5½	2½	3½	1½	1½	1½	4½	3
Denman,	10½	6½	4	70°	6½	6½	2½	3½	1½	1½	1½	4½	3
Thynne,	11	7	4	63°	6½	6½	2½	3½	1½	1½	1½	4½	3
Du Bois,	17½	9½	8½	50°	8½	8½	2½	3½	...	1½	1½	5½	3

TABLE III.—OF THE CURVATURES OF THE FORCEPS.

Forcipum Auctores.	Longitudo Curvaturæ	Altitudo Curva- turæ supra lineam hori- zontalem.	Altitudo Curva- turæ infra lineam hori- zontalem.
Levret, 2,	$8\frac{1}{3}$ poll.	$3\frac{1}{4}$ poll.	nulla.
Smellie, 2,	4	$1\frac{3}{4}$	nulla.
Pugh, 1,	$6\frac{1}{2}$	1	$\frac{3}{4}$ poll.
Pugh, 2,	7	$1\frac{1}{4}$	nulla.
Levret, 3,	$7\frac{1}{3}$	$2\frac{1}{4}$	nulla.
Johnson,	$5\frac{1}{3}$	$\frac{5}{12}$	1 poll.
Fried,	$7\frac{1}{3}$	$1\frac{1}{4}$	nulla.
Leake,	$6\frac{1}{2}$	$1\frac{1}{6}$	$\frac{1}{3}$ poll.
V. der Laar, 1,	8	2	$\frac{2}{3}$
V. der Laar, 2,	$7\frac{2}{3}$	2	1
Coutouly, 1,	$8\frac{1}{3}$	$3\frac{2}{3}$	nulla.
Pean,	$8\frac{3}{4}$	$3\frac{1}{6}$	nulla.
Sleurs,	$8\frac{5}{12}$	$\frac{1}{6}$	$1\frac{1}{12}$
Young, .. .	6	nulla.	$1\frac{1}{4}$
Evans,	$6\frac{1}{2}$	nulla.	$1\frac{1}{2}$
Mayer, ..	$7\frac{1}{3}$	$1\frac{1}{4}$	nulla.
Starke,	$4\frac{3}{4}$	$2\frac{1}{12}$	$\frac{1}{6}$ poll.
Saxtorph,	$5\frac{5}{6}$	2	nulla.
Osborne,	$5\frac{1}{3}$	$1\frac{2}{3}$	nulla.
Thynne,	$5\frac{2}{6}$	$1\frac{2}{6}$	nulla.
Du Bois,	8	$2\frac{2}{6}$	nulla.

These tables of measurement exhibit the various modifications (or most of them) which the forceps have undergone.

The chief peculiarities may be pointed out in a few words.

1. The most striking variation observable, is in the length of the instrument—some being sixteen or eighteen inches long, and others only eleven. The object of the greater length is evidently to enable us to act before the head has descended into the pelvis. The shorter forceps can only be used when the head is in the cavity. The longer instrument possesses greater lever power, and requires greater skill and care in its management.

2. There is a considerable difference in the distance between the blades of different forceps when closed—some being nearly

wide enough to admit an ordinary sized head,* whilst others approximate very closely.† These instruments must necessarily possess a very different degree of force; with the latter the head may be powerfully grasped and compressed, and a great extracting force exerted, whereas the former can do little more than extract with moderate force, when the resistance is not great. The latter are the more useful in skilful hands, but the former are, perhaps, safer for ordinary use.

3. To some of the instruments a second curve is added,‡ the convexity of which is intended to correspond to the hollow of the sacrum, and the concavity to the symphysis pubis, in order that the instrument may be applied in the axis of the cavity and upper outlet. The second (“*curvatura nova*,” as Mulder calls it,) has been added both to the long and short forceps. I do not believe that it is advantageous in either kind; in the latter it is often very inconvenient. “It is far better to have both these instruments perfectly straight, the diversity of curves recommended by different writers answering no useful purpose.§

4. The fenestrum varies in length and breadth in different forceps—in some it is altogether absent, and in others it is very wide. The object of the latter modification is to avoid as much as possible adding to the bulk of the child’s head, and to diminish the risk of injury to mother and child. I doubt whether the object be attained by this arrangement, and when the forceps are introduced antero-posteriorly, the additional

* Pl. 4, Fig. 3, 5, 7. Pl. 5, Fig. 6, 9. Pl. 6, Fig. 3, 4, &c. &c.

† Pl. 4, Fig. 6, 9. Pl. 5, Fig. 4, 8. Pl. 7, Fig. 1, 5, &c.

‡ Pl. 4, Fig. 7. Pl. 7, Fig. 8, 10. Pl. 8, Fig. 3, 5, 11. Pl. 8, Fig. 2, 7, 9, &c.

§ Denman’s Introduction, 7th Ed. p. 275—note by Dr. Waller.

breadth of the blade which is underneath the arch of the pubis, may prove very mischievous to the sides of the outlet.

5. In other forceps the breadth of the blade is continued to the handle, for the purpose of containing an opening, through which the other blade (which is slightly narrower) is passed, so as to insure their apposition.* Dr. Ziegler, of Edinburgh, has attained this end, by continuing the fenestrum to the handle.

6. Certain contrivances have been added to the handles of the instrument, to prevent their being pressed too closely together;† and in some forceps the blades do not cross, in order to avoid compressing the child's head.‡

7. The blades have been wrapped with leather, to prevent injury to the scalp of the child.§ This plan is now very properly abandoned, as it could not be of any use, and rather added to the difficulty of introduction.

8. Mr. Radford has altered the long forceps, and, as he states, with great advantage.|| The blade, which is to be applied over the occiput, is much shorter than the other, so that when it touches the neck, the other (owing to the oblique position in which the head descends) will embrace a great extent of the anterior part of the head. He has also lessened the compressing power of the instrument, by placing the joint nearer the outer end of the forceps.

9. Dr. Davis, of University College, London, has shewn much ingenuity in varying the forceps, so as to meet the

* Pl. 12, Fig. 3, 4.

† Pl. 5, Fig. 8. Pl. 8, Fig. 1.

‡ Pl. 4, Fig. 3. Pl. 5, Fig. 8. Pl. 6, Fig. 3.

§ Pl. 7, Fig. 1, 2, 5, 6.

|| Pl. 12, Fig. 5.

different circumstances in which they are required. By his kind permission, I have copied two of his plates: in one, the blades of the forceps are unequal in breadth,* and may be used in malpositions especially, and in the other they are of unequal length.†

In London, a modification of Levret's forceps is used for the higher operation, and Smellie's for the cavity of the pelvis. In Edinburgh, both the long and short forceps have the double curve.‡

In Dublin, the long forceps is rarely used, and the short one resembles Smellie's, without the second curvature.

In France, Levret's forceps, or a modification of it, is in general use.

In Germany, the forceps of Boer, Levret, Schmidt, Stark, Siebold, Brünninghausen, Naegelè, Osiander, &c.; and in Italy, the forceps of Levret or Assalini are employed.

For myself, I prefer the long or short forceps, with the single curve, with the blades and fenestra somewhat narrow, and approximating so as to allow of a firm degree of pressure; with their edges smoothly bevelled off; and the blades sufficiently strong to prevent their springing, but not so thick as to add unnecessarily to their bulk.

The hand that is to use the instrument is, however, of more importance than the instrument itself, of which it may be observed with truth, that "that which is best administered is best."

The *object of the operation* with the forceps is,

1. To facilitate delivery, when its progress is arrested by

* Pl. 13, Fig. 1, 2, 3.

† Pl. 13, Fig. 4, 5.

‡ Hamilton's Practical Observations, Part ii. p. 94.

certain malpositions of the head, at the brim or in the cavity of the pelvis.

2. To supply the want of uterine action, or to render it effective for the expulsion of the child.

3. To save the mother from the evil consequences of a labor too prolonged, and from the necessity of a severe operation.

4. To save the life of the child, or at least afford it a chance of escape from certain destruction.

That these objects are attainable, will, I trust, appear from the *nature of the aid* afforded by the forceps, and that they have been in many instances attained, the *statistics of the operation* will prove.

It was not for some time after the invention of the instrument, that its powers, and the limitations of those powers, were understood. The story of Chamberlen's Paris adventure is a good illustration. He visited Paris, and offered to deliver any patient the faculty chose with his instrument ; they gave him a case of distorted pelvis ; he tried, and of course failed, and left the city in disgrace. Had he carefully studied the cases to which the instrument was applicable, he would have been spared the annoyance.

It is evident that the forceps possesses a twofold power :

1. That of grasping and compressing the head of the child.

2. That of acting as a lever of the first kind, and as an extractor.

The compression exercised by it *must* be limited within the degree the head can bear without injury, and *may* be limited by the form of the instrument. The extracting force will be in proportion to the firmness of the grasp, and limited by the resistance, and the danger of injury to the mother.

“To lessen the volume of the child's head in the first instance,

and in a way that may be compatible with life, and which certainly shall not destroy it, is the first object in contemplation in the contrivance of the structure of the instrument. The second is, to afford such assistance as shall be equal to the future completion of the delivery, when the head is thus lessened, and that without any injury to the mother, either in the introduction or application of the instrument, or final extraction of the head ; for it must be obvious, that however lessened the head may be by compression, if the expulsive powers are extinguished, an extracting force must be substituted instead of them, or the woman would remain undelivered, even though the child was ever so much lessened in its volume ; hence the use of that particular structure of the instrument by which the extracting force is given.”*

Now it is ascertained, that if there be space sufficient, such a grasp may be obtained of the child's head, without injury to it, as will enable us to extract it, and that the extracting force thus exercised is not sufficient to injure the mother ; thus the forceps may supply the want of uterine pains.

Many cases occur in which the transverse diameter of the child's head is slightly greater than the antero posterior diameter of the brim, or the transverse diameter of the lower outlet ; but where a slight additional compression would enable it to pass : now if this do not exceed the amount of compression which the head will safely bear, and if the force required for extraction be not sufficient to injure the mother, such compression and extracting power may be afforded by the forceps, which will thus render the uterine action effective. No doubt it requires great tact and long experience to decide upon the probability of success, but we have high authority for the propriety of the attempt in such cases. To

* Osborne's Essays on the Practice of Midwifery, p. 17.

those who lack experience, the failure of a very cautious effort will be an adequate evidence of its impracticability, and with ordinary care, no mischief will be done.

Lastly, in most cases where the head is not impacted, a sufficient grasp may almost always be obtained, either at the upper outlet, or in the cavity, to enable us to change the position of the child.

I trust I have made it appear, from the nature of the aid afforded, that the first and second objects of the operation are attainable ; how far this is the case with the third and fourth, must be shewn by *statistics*. But before I give the results of the operation to the mother and child, it may be well to ascertain the average frequency of its occurrence. For these purposes, I have searched all the records within my reach, and the result is the following tables :

TABLE I.—FREQUENCY OF THE OPERATION.

a. Among British Practitioners.

Date.	Authors.	Total No. of Cases.	No. of Forceps Cases.	References.
1781	Dr. Bland,	1,897	12	Merriman.
1787 to 1793	Dr. Jos. Clarke,	10,387	14	Trans. of Assoc. vol. 1.
	Dr. Merriman,	2,947	21	Synopsis.
1818	Dr. Granville,	640	5	Report of West. Disp.
1825 to 1833	Ed. Lying-in Hospital,	2,452	15	Reports.
1828	Dr. S. Cusack,	398	1	Dub. Hosp. Rep. vol. 5.
1829	Do.	303	3	Do.
1826 to 1837	Dr. Collins,	16,414	24	Prac. Treat. on Midwf.
1834 to 1837	Dr. Beatty,	1,182	9	Dub. Jour. vols. 8, 12.
1834 to 1836	Dr. Ashwell,	1,278	6	Guy's Hosp. Reports.
1838	Mr. Warrington,	88	1	Amer. Med. Journal.
	Mr. Mantell,	2,510	6	Do.
1836 to 1840	Dr. Churchill,	1,700	3	Rep. up to June, 1840.
		42,196	120	

b. Among French Practitioners.

Date.	Authors.	Total No. of Cases.	No. of Forceps Cases.	References.
1797 to 1809	Madame Boivin,*	20,517	96	Memorial, p. 337.
1803 to 1811	Madame Lachapelle,...	22,243	174	Prat. des Accouch.
1808	M. Ramboux,.....	216	2	Velpeau.
1815 to 1828	M. Pigeotte de Troyes,	1,362	2	Do.
1829	M. Papavoine,	24	1	Do.
1829	Hotel Dieu, Paris,.....	280	1	Do.
1830, 1831	Sig. Ciniselli,.....	94	1	Do.
		44,736	277	

c. Among German Practitioners.

Date.	Authors.	Total No. of Cases.	No. of Forceps cases.	References.
1801 to 1807	M. Richter, Moscow,	3,195	49	Velpeau.
1811 to 1827	Mosehner and Kursak, Prague,	12,329	120	Siebold's Jour. vol. 9.
1812 to 1813	C. v. Siebold, Wurtzburg,	318	26	Do. vol. 1 to 3.
1817 to 1826	Do. Berlin,	1,634	212	Do. vol. 3 to 8.
1827 to 1829	E. v. Siebold, Berlin,	491	77	Do. vol. 9 to 11.
1829 to 1833	Do. Marburg, ...	344	34	Do. vol. 10 to 13.
1834 to 1837	Do. Göttingen,	507	37	Do. vol. 15 & 16.
1825 to 1827	Dr. Kilian, Prague,	2,350	120	Velpeau.
1808 to 1814	Dr. Henne, Copenhagen,	555	1	Siebold's Jour. vol. 2.
1826	Do.	130	4	Do. vol. 8.
1821 to 1825	Dr. Riecke,	219,303	344	Velpeau.
1819—20	Dr. Ritgen, Giessen,	180	20	Siebold's Jour. vol. 6.
1825	Dr. Merrem, Cologne,	142	5	Do. vol. 7.
1814 to 1827	Dr. Carus, Dresden,	2,908	184	Do. vol. 9.
	Dr. Naegelè, Heidelberg,	1,411	22	Velpeau.
1825, 26, 27	Dr. Klugè, Berlin,	809	55	Siebold's JI. vols. 7, 8, 9.
1825—26	Prof. Andrée, Breslau,	351	8	Do. vols. 7, 8.
1825, 26, 27	Dr. Brunatti, Dantzie, ...	284	22	Do. vols. 7, 9.
1825—26	Dr. Theys, Trier,	49	3	Do. vols. 7, 8.
1826	Dr. Voigtel, Magdeburg,	29	3	Do. vol. 8.
1827—28	Dr. Küstner, Breslau,	370	8	Do. vols. 9, 10.
1830, 31, 32	Dr. Adelman, Fulda,	170	7	Do. vol. 14.
1797 to 1837	Dr. Jansen, Ghent,	13,365	341	Med. Gazette, March 6, 1840. Schmidt's Jahrbücher.
		261,224	1,702	

* I have omitted Baudeloeque's statistics, as they are included in Madame Boivin's. He met with 37 forceps cases in 12,751 labors.—*L'Art d'Accouch.* vol. ii. p 556.

Thus, among British practitioners, we find 120 forceps cases in 42,196 cases of labor—or about 1 in 351½.

Among the French, we have 277 forceps cases in 44,736 labor cases—or about 1 in 162.

And among the Germans, 1702 forceps cases in 261,224 labor cases—or about 1 in 153½.

If we add the whole together, we find 2099 forceps cases in 348,156 cases of labor—or about 1 in 165.

TABLE II.—RESULTS OF THE OPERATION TO MOTHER AND CHILD.

Authors.	No. of Forceps Cases.	Mothers lost.	Children lost.
Dr. Smellie	52	2	9
Mr. Perfect	18	2	4
Dr. Jos. Clarke.....	14	2	Not stated.
Dr. Merriman	21	0	6
Dr. Granville	5	1	Not stated.
Dr. Ramsbotham ...	11	3	5
Ed. Lying-in Hosp.	15	Not stated.	5
Dr. Maunsell	4	0	1
Dr. Beatty, Sen.....	111	0	0*
Dr. Gooch	6	1	0
Dr. Ashwell	6	Not stated.	3
Mr. Warrington ...	1	0	0
Dr. R. Lee	42	3	31
Dr. Churchill.....	9	0	0
Mad. Boivin	96	Not stated.	20
Mad. Lachapelle ...	79	14	23
Dr. Böer	19	2	5
Dr. Siebold	312	11	47
Dr. Ritgen.....	20	3	4
Dr. Andrée	8	1	4
Dr. Brunatti ...	23	1	6
Dr. Voigtel	3	0	0
Dr. Küstner	8	2	1
Dr. Adelman	7	1	1

* As regards the children, Dr. Beatty's expression is "all the children that we had any reason to think were alive at the commencement, were born

Now if we add together the number of forceps cases where the result to the mothers is stated, we shall find, that of those detailed by British practitioners, of 294 forceps cases, 14 mothers were lost, or 1 in 21.

Amongst the French and Germans, in 479 cases, 35 mothers were lost, or about 1 in 13½.

Whilst of the children, the British statistics give 64 lost in 296 cases, or about 1 in 4½; and foreign statistics 111 in 575 cases, or about 1 in 5.

The total result is, that in 773 forceps cases, 49 mothers were lost, or about 1 in 15¾; and in 871 cases, 175 children were born dead, or about 1 in 5.

It will be admitted, I think, that these tables exhibit British practice in a very favorable light.

I am unable to explain the greater proportional frequency of operations in some of the German reports, except by supposing that their hospitals, being on a small scale, are reserved for the worst cases met with in extern practice among the poor. Were I quite sure of this being the case, however, I should have omitted them from Table I., as they would then manifestly be an unfair record of the proportional frequency of the operation.

It would be unjust to compare the frequency of forceps cases among the German and British, without recollecting the minor degree of mortality amongst the children in the

living, and none of the whole number had any injury or mark whatever inflicted by the instrument,"—*Dublin Med. Trans.* New Series, vol. i. pl. 1, p.52.

Dr. Beatty's eminence in his profession, and his personal character, are sufficient guarantee for the accuracy of this statement, and therefore I have given the statistics of British practice the benefit of his report.

I have added the forceps cases which have occurred to myself in private practice, from my note book, to those occurring at the Western Lying-in Hospital, and the result is the number marked in Table II.

practice of the former, and the very much smaller number of crotchet cases. It would seem, that although the Germans use the forceps much more frequently than we do, they often thereby avoid a much more fatal operation.

The rate of mortality exhibited by the last table, is undoubtedly an over estimate, as many of the deaths included in it were unconnected with the operation ; but as this is not stated, except by a few authorities, though probably equally true of all, I have preferred quoting the numbers given, and appending this note.

It is greatly to be regretted, that the statistics of the result of the operation to the mother and child are so limited. Many writers who have carefully recorded the *number* of operations, have very carefully omitted to state whether the mother recovered, or the child was saved, leaving us to make the inference that both were saved. But we know that such an inference would be incorrect. Can any one believe, that whilst British practitioners lose one woman in twenty-one, Mad. Boivin and M. Baudelocque lost none at all ?

I have, therefore, omitted or marked in the latter table, all those who have neglected to state the results.

If we fail in our endeavours to extract the infant with the forceps, we have no resource but to employ the perforator and crotchet, and, therefore, in estimating the *utility* of the forceps, we must also compare it with its *alternative* operation, inasmuch as every successful case of the former may be considered as so much gained from the latter.

Now, in craniotomy all the children are destroyed, and one in five of the mothers is lost ; whereas we have seen, that by the forceps we save nearly four out of five of the children, and twenty out of twenty-one of the mothers. If we had more

minute reports, the success would undoubtedly appear much greater.

The special *advantages* of the forceps are said to be :

1. That they are easily applied.
2. That their powers are calculated to attain the object for which they are used.
3. That they do this by imitating the natural powers.
4. That they aid the expulsive efforts of the uterus better than any other instrument, and supply their place, which no other instrument can.
5. That they are less liable to slip than the vectis.
6. That they are attended with less fatal consequences than the perforator and crotchet.

On the other hand, those writers who have defended the use of the vectis, as compared with the forceps, have enumerated several *disadvantages* of the latter—such as,

1. The difficulty of their application in all cases, and in some the impossibility of using them, owing to the position of the head or want of space.

That the introduction of two blades may be more difficult than that of one, in *certain* cases, is very evident, but that there is much greater difficulty in introducing the forceps than the vectis, in the majority of cases proper for its use, I do not believe. The latter part of the objection is of no force, because those cases where the introduction of the instrument is impracticable, are not cases in which its employment is contemplated, and, undoubtedly, when the impaction was so great as to prevent the application of the forceps, it would more surely render the vectis useless.

2. The risk of bruising the os uteri in the application of the forceps.

“ In almost all cases where instruments are employed, the head of the child is pushed down in a conical form, so that

the os uteri is often not dilated more than the breadth of the apex of the humid scalp, which is engaged in it ; the dilatation is painful and difficult, on account of the os uteri being thickened. When the forceps is introduced in these circumstances, the parts suffer much contusion, and often laceration, that must in general prove fatal.”*

I do not think that there is much risk of injury, if the operator be a competent person. Dilatation or dilatibility of the os uteri being an essential condition of the operation, Mr. Dease's supposition would involve great want of skill and care in the operator.

3. That when the forceps are applied, they are apt to slip and lose their hold.

This may sometimes happen, but it is much more likely to occur with the vectis.

4. That the pressure upon the child's head may destroy life.

No doubt ; but as the pressure is regulated by the resistance, this ought never to happen, except in cases in which the crotchet must otherwise be used, and in which the vectis would be powerless.

5. That by adding to the volume of the head, they are apt to lacerate the perineum.

That the compression exercised upon the head of the child is amply sufficient to compensate for the additional bulk of the blades, there can be no doubt, even in those cases where the extraction is most easy ; but we have an additional safeguard in the removal of one of the blades just before the head passes over the perineum.

6. That as they can never be used secretly, they have a tendency to alarm and intimidate the patient, and in this respect are inferior to the vectis.

* Dease, Observations in Midwifery, p. 40.

When speaking of the vectis, I mentioned their secret employment, among other disadvantages; and I now quote this objection, for the purpose of entering once more my earnest protest against the employment of any instrument secretly.*

Having now given the history of the operation, stated its objects, and shewn that they are attainable, from the nature of the aid afforded, and from numerical calculations; and having enumerated the positive and comparative advantages of the operation, with the objections that have at different times been made to the use of the instrument, I shall next proceed to mention the *cases to which the forceps have been considered applicable*. I would wish, however, that it should be remembered, that as I am not writing the history of my own experience, but that of others, so I am not to be considered as necessarily the advocate of the forceps in all these cases. I have selected them from authors of the highest authority, and their evidence is altogether independent of support from me.

I must also premise, *that in no case is the forceps (or indeed, any instrument) to be applied, until we are perfectly satisfied that the obstacle cannot be overcome by the natural powers, with safety to the mother and child.*

1. When the head is unable to enter the brim of the pelvis from malposition, (suppose with its long diameter corresponding to the antero-posterior diameter of the upper outlet), which is not rectified by the pains, the long forceps may be

* "On est assez dans l'usage de cacher le forceps à la femme dans le crainte de l'effrayer; mais nous croyons, que rien ne peut la rassurer d'avantage quo de le lui faire connoître avant et de le lui laisser examiner, puisqu'on ne peut s'en servir sans qu'elle s'en apperçoive."—Baudelocque *l'Art des Accouch.* vol. ii. p. 136, note.

applied to change the position, provided the os uteri be fully dilatable, and that the change cannot be made by the hand alone.

2. When the head is in the upper outlet, fitting closely, but not impacted, and the pains are inadequate to overcome the resistance; a little help with the forceps, applied laterally, (in relation to the pelvis,) will often overcome the difficulty.

“The first material case where the forceps may be applied to advantage, is where the basis of the skull is detained at the brim, and the round hollow part of the head is fixed pretty low into the pelvis, and the os uteri, as it were, wholly obliterated by the effects of the labor pains.”*

3. When the head, presenting at the brim, is somewhat too large for the antero-posterior diameter of the pelvis; if the excess be not more than may be remedied by the allowable degree of compression, the operation may be successful.†

“The cases, of all others the most frequent in their occurrence, consist of those laborious labors, in which the child’s head is detained at the brim of the pelvis, the face lying to the one, and the occiput to the other side; a large head, a narrow pelvis, and other causes, impeding the descent.”‡

It will require some experience to ascertain this, before a trial, but as the alternative is the crotchet, it is surely worth while to make a cautious attempt with the forceps, from which no harm need result in case of failure.

In all these cases it will be necessary to use the long forceps; in the following, the shorter are sufficient, but of course either may be employed.

* Cooper’s Compendium of Midwifery, p. 129.

† Smellie’s Midwifery, vol. i. p. 172,

‡ Blundell’s Obstetricy, p. 502.

4. When the head is in the cavity of the pelvis, and is there detained by want of space, if the compression required for its extraction be not greater than the head of the child will bear with safety, the forceps may be safely used, either laterally, obliquely, or antero-posteriorly.*

“The vertex or presenting part of the child’s head must then not only have entered the upper aperture of the pelvis, but the head itself must have descended so far into the cavity as that the basis of the cranium shall be at least parallel with the brim of the pelvis, while the vertex is touching, or resting upon the spinous processes of the ischia. This situation is always discoverable by feeling the ear of the child, which, at this period of the labor (before the turn is completed) is invariably found a little on one side of the symphysis pubis ; whenever an ear, then, can be perceived by the touch, so large a portion of the volume of the head must be engaged in the cavity of the pelvis, that the basis of the cranium is certainly and invariably within reach of the grasp of the instrument, in which case, if applied in the manner directed, the purchase will be so great, and the hold so perfect, that the delivery must be speedily and safely accomplished.†”

Siebold is said to have been able to reduce the transverse diameter of the head of the child six lines with Levret’s forceps ; Oslander, nearly an inch ; Baudelocque, four and a half lines ; Thouret and Velpeau, five or six lines ; and Flamant five and a half lines. Of course the amount will be in inverse proportion to the degree of ossification.

5. In face presentations, the longest diameters of the child’s

* Hamilton’s Pract. Obs. Part II, p. 106.

† Osborne’s Essays on Parturition, p. 90.

head are brought to bear upon the pelvis, adding greatly to the difficulty of its transit through the lower outlet, even when the pelvis is large, and still more, if it be under the average dimensions. In such cases, aid may often be given by the forceps, so as to save the child's life, and to mitigate the suffering and its consequences to the mother. It is not, however, to be assumed, that because the child descends faceling, that assistance will be necessary ; the majority are delivered by the natural efforts.

6. The same observations apply to certain, though more rare cases, when the forehead is turned towards the symphysis pubis.

7. But the utility of the forceps is seen more clearly in the cases to which I have before alluded, where the pains, at first very strong, have gradually declined so as to be nearly or altogether powerless, but not from the resistance occasioned by a narrow pelvis. There may be sufficient space, the os uteri and external parts well dilated, and yet the labour does not advance. In such a case, the second stage cannot be very much prolonged without certain symptoms arising, indicative of danger to the mother ; and here we are able to relieve her without difficulty or risk, and to save the child (if it be alive at the time) by the timely use of the forceps.

In such cases (and every one must have met with them) I think I may say, that the operation adds absolutely nothing to the danger either to mother or child. *

“ L'inertie ou le défaut de contractions de l'uterus est un des cas pour lesquels on applique le plus frequemment le forceps.”†

* Flamant, *Memoire pratique sur le Forceps*, p. 37.

† Velpeau, *Traité des Accouch.* p. 418. Brussels Ed.

8. When the hand or arm descends with the head, the additional bulk will require more expulsive force, and occasionally aid must be afforded by the forceps.

9. In some cases of convulsions, hemorrhage, and rupture of the uterus, where the head is within reach, the forceps are found extremely useful in expediting the delivery.

10. In certain cases of breech presentation, it is very difficult to extract the head after the body is expelled, either from malposition, or from the incompressibility of the base of the skull; in these cases the difficulty may be removed or overcome by the forceps.

11. The forceps may be used after vaginal hysterotomy or symphyseotomy.

12. In prolapse of the funis, when it is an object to hasten the labor, in order to save the child. The pulsation of the cord will shew whether the operation affords a chance.

These are, I believe, all the cases in which the forceps have been used or recommended by high authority; to complete the subject, I may mention certain cases in which they ought not to be employed.*

1. In distortion of the pelvis, or when its calibre is diminished from any cause, such as tumors, exostosis, &c. if the narrowing of the pelvis be too great to admit of the passage of the child's head, when moderately compressed; such cases can only be terminated by the perforator.

* "First, then, it should not be used when there is a certainty, from the indications already mentioned, of the child being dead. Secondly, it cannot be used when the impediment is from any distortion of the bones that form the pelvis. Thirdly, when it proceeds from narrowness of the pelvis; that is, when the sacrum and pubis are too near each other. Fourthly, when the head has been so long in the passage, that the circumjacent parts are swollen. Fifthly, and lastly, when by any means the head cannot advance so far as to be within reach of the instrument."—*Sir Fielding Ould's Treatise on Midwifery*, 1742, p. 157.

2. When the os uteri is rigid and undilatable, or when the passages are much inflamed and swollen, the forceps ought not to be used.

“If you find these parts rigid, you must not even think of using the forceps or lever: the very thought is almost sufficient to bruise, lacerate, and destroy.”*

3. In some cases, where the patient has been mismanaged, and allowed to remain too long, the system is in such a state that we are obliged to have recourse to the most expeditious mode of delivery. In these cases (especially if there be a doubt of success with the forceps) it may be wiser to have recourse to the perforator. But such cases could scarcely happen under the care of a well-educated practitioner, nor are they at all frequent.

4. If the child be dead, we are advised to prefer craniotomy. If we are quite certain that the child is dead, the principal objection against craniotomy is removed; but this it is not always easy to determine. The stethoscope is a most valuable source of information; but it must be remembered, that while its positive evidence is unquestionable, the negative evidence (i. e. no sign being audible) is not equally conclusive.

Dr. Collins, whose experience has been very extensive, remarks: “I know of no case where the advantage derived from the use of the stethoscope is more fully demonstrated, than in the information it enables us to arrive at, with regard to the life or death of the fœtus, in the progress of tedious and difficult labors.”†

We next come to consider the *period for operating*. “It

* Blundell's Prin. and Pract. of Obstetricy, p. 49. Baudelocque, l'Art des Accouch. vol. ii. p. 139.

† Practiseal Treatise on Midwifery, p. 18.

is one of the nicest points in practice, correctly to decide, whether any given case of protracted labour may be trusted with safety to the further exertions of the natural agents, or whether the means of art ought to be promptly brought to their assistance. In determining this important question, the whole of the symptoms are to be collectively and severally considered, and their different tendencies accurately examined, that we may equally escape the imputation of haste and indiscretion on the one hand, and of delay and indecision on the other ; yet, let us ever bear in mind, that more injury may possibly accrue from too long delay, than arise from premature assistance.”*

“ But though it is our duty to avoid, if possible, the use even of those instruments which are intended to be employed without injury to mother or child, it would on the other hand be absurd to defer their use till the child was dead, and the mother reduced to a state not of apprehended, but of real danger ; or which is worse, if she should survive, her life would be rendered miserable, from the consequences of mischief done before the instruments were used.”†

The decision of this point must, in a great measure, be left to the judgment and experience of the practitioner. No very definite rule can be laid down : we find both individuals and nations differing upon the subject ; the Germans operate more frequently, and at an earlier period than the British, but on the other hand, they have fewer crotchet cases.

In forming our decision, there are several points for consideration :

1. The local circumstances of the case, such as the position of the head, space in the pelvis, complications, &c. ; these

* Ramsbotham's *Practical Observations on Midwifery*, vol. i. p. 256.

† Denman's *Introduction to Midwifery*, p. 275, 7th Ed.

constitute the principal grounds of necessity for the operation, and have been enumerated.

2. The general condition of the mother.—During the first stage we find little or no effect produced upon the system of the mother by the duration of the labor. After the second stage, however, has lasted for some time, (say from fourteen to twenty hours,) a new series of symptoms arises: she becomes feverish, and the pulse quickens, the tongue is dry and furred, the vagina is hot and dry, or the discharge is changed in color, &c. If the labor be allowed to continue, vomiting occurs, the abdomen becomes tender, the pains are suspended or feeble; the head aches; the pulse rises to 120 or 140; restlessness and jaetitation supervene, &c. &c., and the patient is in imminent danger; and these symptoms may arise, whether the delay be caused by insufficient pains, by malposition, or by narrow pelvis.

Our great object in the use of the forceps, is to anticipate these formidable symptoms, and to reseue the patient from the danger. I think then, that as regards the mother, we may conclude :

1. That as these formidable symptoms are not consequent upon a prolonged first stage; therefore, “before the completion of the first stage of a labor—that is, before the os uteri is perfectly dilated, and the membranes broken, the use of the forceps cannot properly come under contemplation.”* But I would remark, that when the obstacle is at the upper outlet, the second stage virtually commenees when the os uteri is fully dilatable, as the head *cannot* pass through it, and the usual symptoms may arise if the labor be sufficiently prolonged.

2. That when the second stage has lasted so long, as to

* Denman's Introduction to Midwifery, p. 275.

prove the inadequacy of the natural powers, or at all events, as soon as the symptoms of a prolonged second stage make their appearance, (quick pulse, dry tongue, fever, &c.,) then we ought promptly to interfere.* “A practical rule has been formed, that the head of the child shall have rested for six hours as low as the perineum, that is, in a situation which would allow of their application, before the forceps are applied, though the pains should have altogether ceased during that time.”†

I would rather place dependance upon the *symptoms*, than upon the *duration of the labor* merely; some patients will shew more signs of suffering after six hours, than others after twelve or sixteen. Dr. Collins observes: “Let it be carefully recollected, at the same time, that so long as the head advances ever so slowly, the patient’s pulse continues good, the abdomen free from pain on pressure, and no obstruction to the removal of the urine, interference should not be attempted, unless the *child be dead*.‡

At the same time, as we know that after a certain duration of the second stage, these unpleasant symptoms do arise, the length of the labor cannot be altogether omitted in our estimate of the case, and is a reason for great vigilance.

3. We must not omit the consideration of the life of the

* Dr. Hamilton advocates an earlier interference, and his opinion is worthy of attentive consideration. He says: “There is too much reason to believe that British practitioners, from their unwillingness to give pain, or hurt the feelings of their patients, are apt to procrastinate, and to lose the favorable time for safe and effectual interference. No intelligent practitioner would wait in cases where the labor throes cease to have any influence in advancing the delivery of the head of the infant within reach of the forceps, till there be heat or tenderness of the passages, and still less, till the patient’s strength be much exhausted.”—*Practical Observations*, Part ii. p. 96.

† Denman’s Midwifery, p. 275.

‡ Practical Treatise on Midwifery p. 17.

child ; after the second stage has lasted a certain time, there is considerable risk to the child, and it may even die before the symptoms on the part of the mother become very formidable, though this is not always the case. This condition may sometimes be detected by the stethoscope, the action of the heart becoming feeble and irregular. In such a case, if no counter-indication existed, we should be justified in interfering for the purpose of saving the child's life, provided the operation were practicable.

Method of operating.—When once we have determined upon the propriety of operating, the operation itself is not very difficult ; it requires a thorough *tactile* knowledge of the pelvis, some manual dexterity and steadiness. I shall first describe the application of the long forceps at the brim, and then (the long or short forceps) in the cavity of the pelvis.

1. *The long Forceps.*—These may be applied either in the transverse or antero-posterior diameter of the pelvis.* If our object be compression, or a change of the position, the antero-posterior diameter will be the best ; but if additional force be requisite, they may be applied transversely, (i. e. over the occiput and forehead of the child.) In this position, as there is more space, their application is more easy ; but it must be remembered, that in proportion to the grasp we take of the head in its longitudinal diameter, we diminish that diameter, but increase the transverse, and so may add to the difficulty of the descent of the head. Therefore, only sufficient force should be used to enable us to extract.

“ When about to apply the long forceps, it is to be

* The French practitioners speak of the application of the forceps with reference to the diameters of the head of the child. The British, Germans, and Russians, refer rather to the diameters of the pelvis.

remembered that the difficulty exists at the brim of the pelvis, that the antero-posterior diameter, or that from the symphysis pubis to the promontory of the sacrum, is diminished ; in the application of the instruments, therefore, care should be taken that they be placed over the head, in such a situation that they may occupy the most roomy part of the pelvis, which will be its lateral diameter. In a natural presentation and situation, one blade of the instrument will consequently be placed over the forehead, the other over the occiput.”*

The patient is to be placed on her left side, (or on her back,) close to the edge of the bed ; the forceps, warmed and oiled, are to be within reach, and the operator should introduce two or three fingers of his left hand, or his whole hand, during an interval of pain, along the head of the child within the os uteri, for the purpose of protecting it, and guiding the blade of the forceps.

The upper or anterior blade is then to be passed along the inside of the fingers or hand, in the axis of the upper outlet, until it glides over the part of the head to which we wish to apply it. It is then to be retained ‘*in situ*’ by an assistant, and the hand or fingers withdrawn ; the right hand (or two fingers) is next to be introduced on the opposite side, and the second blade passed carefully up, and applied to the head. If the blades have been properly placed, they will lock ; but if not, one must be withdrawn and re-introduced. When locked, the handles may be tied together or grasped firmly, and the extracting force applied, of which I shall speak presently.

The most important points to remember in the application of the long forceps are :

1. To guard the os uteri with one hand.

* Waller's Edition of Denman, p. 279, note.

2. To introduce the upper or anterior blade first.
3. To pass the blades in the axis of the upper outlet.
4. To regulate the force of the grasp, according to the circumstances of the case.

II. *The short Forceps*.—These may be passed in accordance with the transverse, oblique,* or antero-posterior† diameters of the pelvis. In many cases where it would be impossible to pass them laterally, we may succeed in passing them antero-posteriorly, and in extracting the child; but we must bear in mind the observation made when speaking of the long forceps, that pressure in the long diameter of the child's head (i. e. when the forceps are introduced obliquely or antero-posteriorly,) increases its lateral or transverse diameter, and so far augments the obstacle to its extraction.

The bladder and rectum should be evacuated before the attempt is made, and the forceps warmed and oiled, as already mentioned. The patient is then to be placed near the edge of the bed, and after a careful examination, our decision formed as to the part to which the instrument is to be applied. One or two fingers are then to be introduced into the vagina, during an interval of pain, to guide the forceps and protect the soft parts.

“The forceps must be introduced, one blade after another, first introducing the fingers of each hand to carefully guard the bows past the os uteri, and fairly over the side of the head, for should the os uteri get between the head and forceps, it would at once prevent any firm hold of the head, and consequently fail you in the attempt, and also bruise the part that intervenes, so as to endanger an excoriation and great inflammation.”‡

* Smellie's Midwifery, vol. i. p. 165.

† Chapman on Midwifery, p. 19; also Baudelocque, l'Art des Accouch, vol. ii. p. 136.

‡ Pugh, Treatise of Midwifery, 1754, p. 83.

We must always be careful that “the point of the instrument be constantly kept in contact with the head; to effect which it will be necessary to remember, that the child’s head is in every part convex, and, therefore, as the instrument advances, the handle must be raised, or otherwise in its progress it may pass on, instead of going under, the os uteri, if any part should remain in contact with the child’s head.”*

The forceps must be introduced at first in the axis of the lower outlet, but this direction must be almost immediately changed into that of the upper outlet, or there will be danger of wounding the posterior wall of the vagina. The upper or anterior blade should be introduced first, and then the lower or posterior one. When both are applied, they ought to be opposite, and if so, will easily lock, but “if, on endeavouring to lock the forceps, it should be found that they do not readily come together, they have not been properly introduced; no force or violence should be used to bring them together, but the second blade should be withdrawn, and introduced afresh.”†

Great care must also be taken, that the soft parts, or hair, are not included in the lock, as this will give great pain. The lower part of the handles may be tied together by a ligature, so as to determine the force of the grasp, which has this advantage, that it fixes the degree of compression, and leaves the operator at liberty to occupy himself with the extraction only. If, however, the head fit tightly, and more compression than merely that which is sufficient for extraction be necessary, it will be useless; the operator must then regulate the compression with his hand, and extract at the same time.

“When the forceps are first locked, they are placed far

* Osborn, *Essays on Parturition*, p. 99.

† Merriman, *Synopsis of Difficult Parturition*, p. 197.

backward, with the lock close to, or just within the internal surface of the perineum ; and they can have no support backwards except the very little which is afforded by the soft parts. The first action with them should therefore be made, by bringing the handles, grasped firmly in one or both hands to prevent the instrument from playing upon the head of the child, slowly towards the pubes, till they come to a full rest. Having waited a short interval with them in this situation, the handles must be carried back in the same slow but steady manner to the perineum, exerting, as they are carried in the different directions, a certain degree of extracting force ; and after waiting another interval, they are again to be raised towards the pubes, according to the situation of the handles.”*

We must remember, “that the force employed in extracting the head be always and steadily from blade to blade, but with intervals resembling the labor pains, and constantly in the direction of the axis of the pelvis, till the occiput begins to emerge from under the arch of the pubis, when the handles are to be raised over the symphysis pubis with the right hand, while the left is applied to strengthen and preserve the perineum.”†

“The whole power or force which the instrument enables us to use, ought not to be exerted in the first instance, but such a degree as any individual case may require, which can only be known by first trying a moderate degree of force, increasing it slowly and deliberately, according to the exigence of each case.”‡

When we thus employ the power we possess gradually,

* Denman's Introduction, p. 281.

† Osborn, Essays on Parturition, p. 100.

‡ Denman's Introduction, p. 280.

steadily, at intervals, and in the direction of the axes of the pelvis, we must not forget the danger (in some cases at least) from pressure or contusion. Our guide in this matter is the pulse, which rapidly rises if injury be inflicted.

“ If the pulse be 120 or 130 before you commence operations, it is clear that you cannot, from counting the beats, take an intimation whether the soft parts have or have not sustained injury ; but if, before the forceps be applied, the pulse is under 100 in the minute, then should contusion be produced by your efforts with the instrument, the rise of the pulse will indicate it. After every effort with the forceps, therefore, count, waiting two or three minutes, so as to allow the beats to subside after muscular exertion, and count completely round the circle. If you find it below 100, no serious injury has been inflicted ; if the frequency is increasing, although it do not necessarily follow that serious injury has been inflicted, yet the existence of contusion becomes probable, and further efforts must not be made without much further consideration.”*

When our efforts have been so far successful, that the occiput emerges from the lower outlet, if there be pains, it is better to remove one blade (the posterior one, when they are applied antero-posteriorly) of the forceps, to lessen the risk of laceration, and the perineum should be carefully supported by an assistant, whilst the operator uses the other blade as a lever if necessary.

If the head be high up in the pelvis, we must take care that the usual half turn be made as it descends, so as to bring the face into the hollow of the sacrum.

In breech cases, where the head is detained, the operation is not very different ; the blades are to be passed up antero-

* Blundell's Principles and Practice of Obstetrics, p. 505.

posteriorly, or laterally, and locked across the chin, or back of the head, and extracting force applied, gently, firmly, and at intervals, not forgetting the natural turns, so as to bring the face into the hollow of the sacrum, if possible.

Difficulties.—"The difficulty of applying the forceps is most frequently occasioned by attempting to apply them too soon ; or passing them in a wrong direction ; or by entangling the soft parts of the mother between the instrument and the head of the child, against all which accidents we are to be on our guard."*

1. The first difficulty we meet with is in the introduction of the blades. There may not be space enough, and if we find this to be the case, after a fair and careful trial, we are not to persist at the risk of injury to the mother or child, but craniotomy must be performed.

When the head is pressed down against the tuberosities of the ischia, there may be some difficulty in passing the blades between them, and if the head cannot be raised up during an interval of pain, the forceps had better be applied antero-posteriorly, or both blades being introduced posteriorly, we may gradually slip them to either side.

I do not speak of the difficulty of applying the forceps when the os uteri is rigid, because it should never be attempted.

2. As I have already mentioned, there may be some difficulty in locking the blades, and then one of them must be withdrawn and re-introduced. It is quite possible to deliver the child without locking the blades, but there is more chance of injury, and the instrument is more apt to slip.

3. The extraction may be difficult or even impossible. The

* Denman's Introduction, p. 279.

great value of experience in such cases is, that it teaches us how far we may carry our efforts without injury. Perhaps a little more compression or a little more force may crown our efforts with success, provided that it do not exceed safe limits. But great care and caution will be necessary, and if we find our efforts fruitless after a fair trial, we shall then be justified in having recourse to the perforator, nor will the patient be the worse for the failure with the forceps, if the attempt have been judiciously made.

The principal *dangers to the mother* are :

1. In the introduction of the blades, if it be not effected in the axis of the upper outlet, the vaginal parietes may be lacerated, and if the cervix uteri be not guarded by the hand, the blade may be pushed through it, or it may be included between the end of the blade and the child's head. Cases of mal-practice illustrative of these dangers might easily be quoted, but it is sufficient for my purpose to allude to them as a caution.

2. The soft parts in the pelvis may be bruised or lacerated in the extraction.

3. The perineum may be lacerated.

The *dangers to the child* arise :

1. From want of care in introducing the blades, by which the scalp may be bruised or torn, or an ear cut off.

2. From excessive compression, by which the skull may be indented, the bones fractured, or death from pressure induced.


Dr. Blundell has given a distressing picture of the accidents which may result from an incautious or maladroit use of the forceps.

“ The grand error you are apt to commit in using the long forceps, is force. In violent hands, the long forceps is a

tremendous instrument ; force kills the child, force bruises the softer parts, force occasions mortification, force breaks open the neck of the bladder, force crushes the nerves ; beware of force, therefore, *arte non vi*. Other errors, too, there are, against which I beseech you to guard. You may use the forceps without heed ; you may try to use it when the parts are rigid, and the os uteri not fully expanded ; you may attempt to apply it, without knowing the position of the head ; you may oscillate the instrument too extensively from side to side ; you may draw without intermission, instead of imitating the pains ; you may close the handles too forcibly by the hand or ligature ; you may hurry the head through the outlet ; you may neglect to throw the face towards the sacrum ; you may forget the perineum ; you may fail to conduct the head, when it emerges, towards the abdomen and the nerves, by drawing it too much upon the perineum.”*

After-Treatment.—The first symptom which will require our attention, is the shock caused by the operation. If it be great, a combination of opium with ammonia will be found the best remedy, with wine and water in moderate quantity. If it be not severe, perfect quiet will be sufficient, and the subsequent management is the same as after ordinary delivery, with increased caution, however, and daily attention to the state of the vagina. If there be any soreness or inflammation, warm water injections should be used twice a-day.

* Principles and Practice of Obstetrics, p. 509.

 Since the last sheet went to press, I have discovered that I have omitted Dr. Thos. Beatty's cases from Table II. He used the forceps nine times, but one was a case of ruptured uterus, and may be excluded from our calculation. Of the eight remaining cases, he lost none of the women, and five of the children.

These numbers, added to the others, will slightly diminish the proportion of deaths among the mothers, and increase it among the children.

ESSAY V.

ON THE PERFORATOR AND CROTCHET.

CRANIOTOMY. CEPHALOTOMY. EMBRYOTOMY. EMBRYULCIA. &c.

*Cephalotomie. Embryotomie. Fr. Enthirnung. Perforation
des Kindes Kopfes. G.*

THE next obstetric operation we have to consider, belongs to the second class, that is, where one life is sacrificed to secure the other ; the mother's safety being purchased by the destruction of her child, in cases where both would be lost if no interference were attempted.

The instruments (or part of them) employed in this operation, are of great antiquity ; and although they were originally proposed for the extraction of dead children only, yet this scruple had no effect in saving the life of the child, but merely postponed the interference until after its death. This conscientious quibble (refusing to destroy a child, but allowing it to die) was soon detected, and then the hook was used with living children, provided that delivery were otherwise impossible.

The class of cases to which it was applied, doubtless included a vast number which were subsequently relieved by

the forceps ; but there was still left a great many in which it was indispensable.

Having premised these observations, I shall proceed with a sketch of the history of craniotomy, and the use of the crotchet.*

Several of the ancients recommend this operation. Hippocrates advises the breaking up of the cranium and extraction by the hook.

Moschion advises embryulcia in those cases where the fœtus cannot be extracted by the hands, and if embryulcia be insufficient, the exsection of the limbs and body of the child.†

Albucasis, the Arabian physician, describes instruments for compressing and breaking up the child's head, and others for extracting it.‡ (*Pl. 14, Fig. 1, 2, 3, 4.*)

Of certain cases of difficult labor, when the child is presumed to be dead, Celsus remarks, “Si caput proximum est, demitti debet uncus, qui vel oculo vel auri, vel ori interdum etiam fronti rectè injicitur.”§

In the ‘Birth of Mankind,’ written by Eucharius Röslin, translated into Latin about the year 1535, and into English by Thomas Raynalde, in 1634, I find the hook recommended to bring away dead children. “If so be,” he

* I have not thought it necessary to enter into the morality of the operation ; the concurring testimony of all the modern authorities has established it as an axiom in midwifery, that when both lives are in jeopardy, the safety of the one may lawfully be secured by the sacrifice of the other ; and that of the two, the life of the mother is unhesitatingly to be preferred.

For the arguments of the French Sorbonists upon this subject, see *Peu, Pratique des Accouch.*

† *Stæhius, Authores de Morbis Mulierum*, p. 13.

‡ *Ibid*, p. 444.

§ *Kilian, Die Operative Geburtshülfe*, vol. ii. p. 702.

says, "that it lie the head forward, then fasten a hook either upon one of the eyes of it, or the roof of the mouth, or under the chin, or on one of the shoulders—which of those parts shall seem most commodious and handsome to take it out by, and the hook fastened to draw it out very tenderly, for hurting of the woman." If the head be too large, it is to be opened with a sharp penknife, or broken in pieces.

He also recommends excision of the extremities, if they present, (the child being dead) or evisceration, to facilitate the delivery.

Ambrose Paré's work is dated 1579, and it was translated into English in 1634. In it are given plates of different hooks for drawing out the child, and a knife for the excision of the limbs. (*Pl. 14, Fig. 6, 7, 8, 9.*)

In 1635, Guillemeau's work was translated, and Paré's hook was recommended. He agrees with the preceding writers, that it is proper to use this hook with dead children, but he goes a step further, for whilst admitting the difficulty of ascertaining the death of the child, and recommending great caution, he adds,

"But if the childe bee alive, it is a great question whether he ought to be pulled forth by the crotchet, presupposing that the mother, having lost her strength, is ready to die except this means bee used; it being more expedient to lose the mother than the childe, who would both die if that were deferred any longer; and whether to save the mother (who is more dear than the said childe) this practise may be ventured. But, as I think, there are none that goe about this businesse but with some touch of conscience, which being a point of divinity, I leave to be decided by them that are more conversant therein than myselfe."*

* Childbirth, or the Happy Delivery of Women, p. 140.

He also recommends opening the head previous to applying the hook, and speaks of using the hook when the head is detained in breech or footling eases.

Deventer, the translation of whose work is dated 1716, objects altogether to hooks and other instruments.

At this time the forceps was known to the Chamberlens, and shortly afterwards to others ; and we cannot be surprised at finding its powers overrated, as though it would supersede destructive instruments. Accordingly, we find Dr. Hugh Chamberlen (in a passage already quoted) proscribing their use, and proclaiming the superiority of his secret.

Chapman also, in 1733, objects to the hook, if the child be living, on the ground that the forceps are sufficient.

A similar opinion was also expressed by Giffard in 1734.

In 1742, Sir Fielding Ould published his valuable work, in which, whilst fully appreciating the utility of the forceps, he points out a class of cases to which it is inadequate, and which require the evacuation of the foetal brain, and the extraction of the child. He objects to Mauriceau's "*tire-tête*," on account of the difficulty of applying it ; in one case he opened the head by means of a pair of ordinary scissors, in order to avoid the danger of using a scalpel ; and subsequently he invented an instrument for this purpose, which he called the "*terebra occulta*."

La Motte, whose work was translated by Mr. Tomkyns in 1746, opened the head of the child with a knife, and then introduced his fingers within the skull, for the purpose of extracting ; but if the head were too high, he caught hold of the skull with a pair of pincers, one blade being internal, and the other external.

In the year 1744, Dr. Simpson described his "ring scalpel," for the purpose of opening the head.*

* Ed. Med. Essays, vol. v. part i. p. 445.

Dr. Burton, 1751, rests the necessity for destructive instruments upon the condition of the mother. He describes a crotchet resembling the one in present use, but recommends two to be used—one on each side the head. He also used a modification of the “*terebra occulta*” before Ould’s work appeared; and he mentions that a person in York used a pair of blacksmith’s pincers for the purpose of extraction.

Dr. Smellie, 1752, in his work on midwifery, clearly defined the cases in which the crotchet is available—not limiting it to those where the child is dead—but recommending it “when it is impossible to turn, or deliver with the forceps,” *i. e.* “when the pelvis is too narrow, or the head too large, to pass.” He recommends the crotchet proposed by Mesnard, which is nearly the same as the one used at present, and a strong pair of scissors, with a stop at the shoulder.

Sir Fielding Ould first employed the scissors, but without the stop. As the perforator now used is but a modification of the scissors, and as the crotchet is nearly the same as was then employed, I shall content myself with simply referring to the subsequent writers, noticing the various modifications of the instrument bye-and-bye.

The reader will find information upon the subject in the works of Pugh,* Memis,† Cooper,‡ Johnson,§ Moore,|| Perfect, Foster,¶ Spence,** Hamilton,†† Dease,‡‡ Aitken,§§

* A Treatise of Midwifery, p. 87. 1754.

† The Midwife’s Pocket Companion, p. 100. 1765.

‡ A Compendium of Midwifery, p. 126. 1766.

§ New System of Midwifery, p. 282. 1769.

|| Essays on the Practice of Midwifery, p. 187. 1783.

¶ Principles and Practice of Midwifery, p. 162. 1781.

** A System of Midwifery, p. 213. 1784.

†† Outlines of Midwifery, p. 288. 1775.

‡‡ Observations in Midwifery, p. 53. 1783.

§§ Principles of Midwifery, p. 78. 1784.

Denman,* John Clarke,† Burns,‡ Merriman,§ Dewees,||
 Conquest,¶ Gooch,** Campbell,†† Ramsbotham,‡‡ Ash-
 well,§§ Blundell,||| F. H. Ramsbotham,¶¶ Collins,***
 Hamilton,††† Meigs.‡‡‡

As to the history of this operation among the French:—we have already seen that Ambrose Parè, in 1579, recommended certain hooks for extracting dead infants, and a knife for cutting off the limbs.

In 1674 M. Viardel published his “*Observations sur la Pratique des Accouchemens naturels, contre-nature et monstreux,*” with the view of showing that no instrument but the hand was needed.

Paul Portal, in “*La Pratique des Accouchemens,*” 1685, mentions his having used the crotchet in certain cases, but most frequently with dead children.

M. Mauriceau, 1690, recommends the crotchet in cases

* Introduction to Midwifery, 1787. p. 307.

† London Pract. of Midwifery. 1803. p. 223. 6th Ed.

‡ Principles of Midwifery, p. 500. 9th Ed.

§ Synopsis of Difficult Parturition, p. 168. 4th Ed.

|| Compendium of Midwifery, p. 573. 1825.

¶ Outlines of Midwifery, p. 113. 5th Ed.

** Lectures by Skinner, p. 216. 1831.

†† Introd. to Midwifery, p. 253. 1833.

‡‡ Pract. Obs. in Midwifery, vol. i. p. 306.

§§ On Parturition, p. 396. 1834.

||| Obstetricy, p. 532. 1834.

¶¶ Lond. Med. Gaz. 1833–34. p. 342.

*** Pract. Treatise on Midwifery, p. 17. 1835.

††† Pract. Observ. vol. ii. p. 117. 1836.

‡‡‡ Philadelphia Pract. of Midwifery, p. 317. 1838.

of impacted head ; and he also invented an instrument called a "tire-tête," which was to be introduced into the skull, and was said to afford a better purchase for extraction.

Peu, "*Pratique des Accouchemens*," 1694, speaks of the crotchet applied in the meatus externus of the ear, without fatal injury to the child, though not without a wound of the integuments.

Pierre Amand, "*Obs. sur la Pratique des Accouchemens*," 1714, does not advocate the use of crotchets ; but he invented a new "tire-tête," consisting of a bag to enclose the head, and six tapes for traction. This instrument was for extracting the head when left in the uterus.

La Motte, "*Traité des Accouchemens*," 1726, speaks of opening the head when impacted, with a bistoury, and extracting with the crotchet.

Jacques Mesnard, "*Guide des Accoucheurs*," 1753, proposed a single and double crotchet, and a pair of craniotomy forceps.

Puzos, "*Traité des Accouchemens*," 1759, recommends the crotchet for evacuating the brain and extracting, in the case of dead children, when the labor is delayed.

Astruc, "*L'Art d'Accoucher*," 1766, directs the crotchet to be used with dead children ; but is very cautious about employing it when the child is alive.

M. Jacob, "*Ecole pratique des Accouchemens*," 1785, recommends Smellie's scissors for opening the head, and a blunt hook for extracting it. He also describes the process of evisceration.

M. Levret, "*Suite des Observations sur les Accouchemens Laborieux*," 1747, gives a plate of a three-bladed instrument (resembling Leake's forceps) for the purpose of extracting the head when left in the pelvis, and also of a single crotchet. A second blade can be fitted to this, and

the two thus joined, Levret used for extracting the body of the child after the removal of the head.

In addition to these authors, I may refer the reader to the works of Baudelocque,* Saccombe,† Dufot,‡ Lachapelle,§ Maygrier,|| Capuron,¶ Gardien,** Velpeau.††

The reluctance with which the French authors recommend the crotchet, and their anxiety to press the use of the forceps, is worthy of remark.

The Italian writers recommend the crotchet for extracting dead infants, but omit all mention of evacuating the brain before life is extinct. The reader may consult the works of Melli,‡‡ Asdrubali,§§ Bongoianni,|||| &c.

Unfortunately I possess but few early German writers ; I must therefore content myself with referring my reader to Kilian's work,¶¶ and to the more recent authors within my reach.

Among those which I possess, I find the operation described with more or less minuteness by Henckel*** (1770);

* L'Art des Accouchemens, vol. ii. p. 231.

† La Science des Accouchemens, p. 280.

‡ Principes sur l'Art d'Accoucher, p. 233.

§ Pratique des Accouchemens.

|| Nouv. Elemens d'Accouchemens, vol. ii. p. 416.

¶ Cours d'Accouchemens, p. 505.

** Traité des Accouchemens, vol. iii. p. 101.

†† Traité Complet. des Accouchemens, p. 465. Brussels Ed.

‡‡ La Comare Levatrice, &c. p. 312.

§§ Trattato Generale di Ostetricia, vol. iii. p. 206.

|||| Lezioni Elementari di Ostetricia, &c. p. 301.

¶¶ Die Operative Geburtshülfe, vol. ii. p. 698.

*** Abhandlung von der Geburtshülfe, pp. 367, 411.

Hagen* (1782); Boer,† Spiering,‡ Steidele,§ Ritgen,|| Osiander,¶ Froriep,** Carus,†† Joerg,‡‡ Busch,§§ Ross-hirt,|||| Kilian.¶¶

Having concluded this short *history* of the perforator and crotchet, I shall next briefly notice the *different modifications of the instruments*, referring to the plates at the end of the volume.

1. Albucasis describes a species of forceps with teeth, which he terms a ‘misdach, or almisdach,’ for the purpose of crushing the head, and enabling it to pass. (*Pl. 14, Fig. 1, 4.*)

2. He also gives a plate of a single and double hook, for extracting the child, and of a knife for cutting off the head. (*Pl. 14, Fig. 2, 3, 5.*)

3. Ambrose Parè contrived two kinds of blunt hooks, and a double one with sharp points, for the extraction of the fœtus, and a knife for excision. (*Pl. 14, Fig. 6, 7, 8, 9.*)

4. Mauriceau invented an instrument which he called a “tire tête,” consisting of a circular plate of steel, fixed

* Versuch der pratischen Geburtshülfe, vol. ii.

† Natürliche Geburtshülfe und Behandlung, &c. vol. i. p. 181; vol. iii. p. 199.

‡ Die pratische Gebnrtshülfe, p. 298.

§ Abhandlung von der Geburtshülfe, &c. vol. iv. p. 57.

|| Anzeigen der Meehan. Hülfen die Entbindungen, p. 378.

¶ Handbuch der Entbindungskunst, vol. iii. p. 566.

** Handbuch der Geburtshülfe, p. 468.

†† Lehrbnch der Gynæcologie, vol. ii. p. 335.

‡‡ Handbuch der Geburtshülfe, p. 505.

§§ Lehrbuch der Geburtskunde, p. 628; and Geburtshülffliche Abhandlungen, &c. p. 101.

|||| Die Anzeigen der Geburtshülfflichen Operationen, p. 139.

¶¶ Die Operative Geburtshülfe, vol. ii. p. 698.

upon a rod. The circular plate was to be introduced into the head, (previously opened by a scalpel,) and being placed across the opening, traction was to be made. (*Pl. 15, Fig. 1, 2.*) This instrument was never much used, owing to the difficulty of introduction, and its feeble power when introduced.

5. Sir F. Ould's "terebra occulta" consisted of a sharp-pointed rod inclosed in a canula or sheath, and retained by a spiral spring at the lower end. (*Pl. 15, Fig. 3, 4, 5, 6.*) When the handle was pressed upwards, and the resistance of the spring overcome, the point of the instrument protruded a certain distance, but was retracted when the pressure upon the handle was removed. Its application to the head was easy and safe ; but it must have been nearly useless, from the small opening it made.

6. Dr. Simpson, of St. Andrews, invented an instrument which he called a "ring scalpel," for opening the skull. (*Pl. 15, Fig. 7.*) It consists of a loop of steel, through which the finger is to be passed, and from which protrudes a sharp-pointed blade about an inch long, by which the cranium was pierced.

7. M. Mesnard described a crotchet which could be used either double or single (*Pl. 15, Fig. 8.*) and which was the original of the one in present use (*Pl. 17, Fig. 5.*) He also gives a plate of a "perce-crane," (*Pl. 15, Fig. 10.*) and a pair of "tenettes à conducteur," that is, craniotomy forceps. (*Pl. 15, Fig. 9.*)

8. Dr. Burton copied Mesnard's double crotchet and "perce-crane" (*Pl. 16, Fig. 1, 2, 3.*) with some slight modification.

9. M. Levret gives a plate of a single crotchet (*Pl. 16, Fig. 5.*) which was arranged to fit into a socket on the top

of another blade (*Pl. 16, Fig. 6, 7,*) for the purpose of protecting the mother, and rendering the purchase more secure.

10. Dr. Smellie recommended Mesnard's crotchet (single or double) (*Pl. 16, Fig. 8, 10;*) but instead of the "perce-crane," he used a pair of strong scissors, with stops at the shoulders to prevent the blades entering too far. Denman abolished the cutting edge altogether, and added strength to the blades. A spoon was also used to evacuate the brain, but it is now very properly discarded.

11. Dr. Wallace Johnson published an account of his instruments for opening the head and extracting the child. (*Pl. 17, Fig. 2, 3, 4.*) I do not know that they have ever been used by any other person.

12. Dr. Aitken proposed a flexible or living crotchet (*Pl. 17, Fig. 1,*) which could be adapted to the convexity of the child's head.

13. M. Baudelocque recommended a very simple extractor, consisting of a small piece of wood, to the centre of which a ribbon was attached. An incision having been made with a bistoury or "perce-crane," the bar of wood was to be introduced and placed crosswise, and then extraction made by the ribbon.

14. M. Oslander has given a plate of an instrument for piercing the skull, and another for extracting. (*Pl. 18, Fig. 1, 2, 3.*) The latter is the same as Smellie's double crotchet.

15. M. Joerg advises an instrument like a trephine for opening the head, and a simple hooked rod for extraction. (*Pl. 18, Fig. 4, 5.*)

16. Dr. Davis has invented several species of crotchet. *Plate 19, Fig. 2, 3,* is a representation of double crotchets,

the blades of which may be applied separately; the hooked blade may be within or on the outside of the skull. *Fig. 5*, is a forceps for breaking up the skull.

These are a few of the principal instruments which have been used in the operation of craniotomy. I have not given a detailed description, because most of them are discarded: the instruments in general use being a modification of Mesnard's simple crotchet, and a pair of scissors with shoulder-stops, as recommended by Smellie, but having a sharp edge on the outside. (*Pl. 17, Fig. 5, 6.*) Mr. Holmes has modified the latter, so that by closing the handles we open the blades. (*Pl. 19, Fig. 6.*)

From the inconveniences sometimes experienced with the crotchet, and to avoid the risk of injuring the mother, craniotomy forceps have been employed by different individuals.

Among the moderns, M. Mesnard has the credit of first inventing and using this instrument, and since his time it has undergone various modifications.

Dr. Haighton used a pair resembling the lithotomy forceps; and since his time Drs. Conquest (*Pl. 17, Fig. 7.*) and Davis, (*Pl. 19, Fig. 1.*) Mr. Holmes, (*Pl. 19, Fig. 7.*) and others, have invented and described varieties of the instrument.* The object of each is the same, viz. to avoid the risk of tearing the soft parts of the mother; and the principle of seizing the skull between two blades, furnished with teeth, is also alike.

I am free to confess that I do not like the craniotomy

* I beg to acknowledge my obligations to Drs. Conquest and Davis, and to Mr. Holmes, for their kind permission to copy the plates of their instruments.

forceps, although I have tried them repeatedly. They are by no means so manageable as the crotchet, and the interposition of the hand of the operator will always protect the mother from injury by the latter.

There is one case, however, in which the forceps may be more useful, and that is, where the bones of the head are extremely hard, so that it is almost impossible to fix the point of the crotchet.

18. M. Baudelocque, jun. has invented an instrument, which he calls a "cephalotribe" (*Pl. 18, Fig. 7.*) for the purpose of crushing the head. It consists of a very strong pair of forceps, about two feet in length—the handles of which are connected by a screw which pierces them, and which is turned by a handle until the blades are so closed as to effect their object. Velpeau states that instruments somewhat similar have been formerly used by Assalini, Osiander, Delpech, Colombe, &c. M. Baudelocque is said to have used it three times successfully (and safely as regards the mother) in the year 1832, and once again in 1834. It is also said that M. Champion has tried it with success.

Its appearance is so formidable, that I doubt if it could be used in this country. I am not aware that the attempt has been made.

The object of the operation of craniotomy is to terminate the labor with safety to the mother, in cases where from the disproportion between the size of the foetal head, and the pelvis, a living child can neither be expelled by the natural powers, nor extracted by the forceps. Such a case, if left to nature (as it is called,) will terminate fatally for both mother and child; consequently, although the child is destroyed to facilitate the delivery, and to save the mother, it can hardly be said to

be sacrificed, inasmuch as no efforts of ours could have ensured its safety.

The case presupposes on the one hand, *actual disproportion, sufficient to prohibit the passage of the fœtal head, even when compressed*; and on the other, *that the distortion is not so great as to prevent the extraction of the child when mutilated*.

Dr. Osborn states that when “the bones approach much nearer to each other than three inches, it is utterly impossible for a living child at full maturity by any means to pass.”* He fixes upon $2\frac{3}{4}$ inches, as the diameter rendering craniotomy necessary. M. Alphonse Le Roi says that $3\frac{1}{4}$, Dr. Aitkin 3, Dr. Jos. Clarke $3\frac{1}{2}$, Dr. Burns $3\frac{1}{4}$, Dr. Ritgen 2, and Dr. Busch $2\frac{1}{2}$ to 3 inches, is the smallest antero-posterior diameter through which a living child can pass.

As to the other limit of the operation, that is, the smallest diameter through which a child can be extracted after craniotomy, Dr. Osborn† remarks :

“Whenever there is a space from pubis to sacrum, or from the fore to the hind part of the upper aperture of the pelvis, equal to an inch and a half, I am convinced it will be always practicable to extract a child by a crotchet, after the head has been some time opened; and the texture of the child’s body is softened by putrefaction (as recommended above,) and the whole of the parietal and frontal bones are picked away.”

Baudelocque says that the crotchet is inadmissible when the diameter is only $1\frac{2}{3}$ of an inch; Dr. Dewees, when it is less than 2:—Dr. Hull and Dr. Burns believe that it may

* Essays on Midwifery, p. 194.

† Ibid, p. 230.

succeed when the diameter is $1\frac{3}{4}$; MM. Gardien and Hamilton when it is $1\frac{1}{2}$; and Dr. Davis when it is 1 inch.

The *nature of the operation* is simple, but the aid afforded may vary in degree.

1. In the case of dead children, the older practitioners used the crotchet alone, as an extracting force, without opening the head.

2. In some cases, where the sutures are very loose, the evacuation of the brain will be sufficient, as the bones of the cranium collapse so much under the influence of the pressure downwards, that the child may be expelled by the natural powers. But in this case, it is assumed that the pains are sufficiently strong and frequent.

3. When (as is frequently the case) the pains are inefficient, or when the state of the patient demands prompt relief, then we must not only evacuate the brain, but add extracting force by means of the crotchet or craniotomy forceps.

4. In some cases, the distortion of the pelvis is too considerable to admit the passage of the head, even when emptied of its contents ; or the obstruction may result from the ossification of the bones of the skull : in either case, an extension of the operation is necessary to complete the delivery. This may be effected by breaking up the cranium with a small pair of forceps, resembling M. Mesnard's ; (*Pl. 15, Fig. 8, 9, 10,*) or, according to M. Baudelocque, jun. by the use of the cephalotribe. It would require unusual hardihood to venture upon the latter instrument in private practice in this country.

5. In these cases of distortion, after the head has been extracted piecemeal, we may find it impossible to bring

away the body of the infant. We must then use the perforator for the purpose of evacuating the contents of the chest and abdomen, and afterwards apply the crotchet to extract the child.

One or more of these modifications of the operation will be successful, in all cases which come within the limits already described.

The positive *advantage* we obtain from embryotomy is the safety of a large proportion of the mothers, who, in addition the children, must have perished, had no aid been afforded. The children of course are all lost.

What the proportion of success is, I shall now endeavour to shew ; but previous to this, I shall adduce whatever evidence we possess to ascertain the comparative frequency of the operation.

TABLE I.—FREQUENCY OF THE OPERATION.

a. Among British Practitioners.

Date.	Authors.	Total No. of Cases.	No. of Crotchet cases.	References.
1781	Dr. Bland,	1,897	8	Merriman's Synop. p. 333
1787 to 1793	Dr. Jos. Clarke,	10,387	49	Trans. of Assoc. vol. 1.
	Dr. Merriman,	2,946	9	Synopsis.
	Dr. Granville,	640	3	Report, p. 25.
1818	Dr. S. Cusack,	701	5	Dublin Hosp. Reports.
1828-29	Dr. Maunsell,	839	5	Ed. & Dub. Jour.
1832-33	Mr. Gregory,	691	2	Dub. Hosp. Rep. vol. v.
1829	Dr. Collins,	16,414	79	Practical Treatise.
1826 to 1833	Dr. Thos. Beatty, ...	1,182	3	Dub. Jour. vols. 8, 12.
1834	Dr. Ashwell,	1,439	3	Guy's Hosp. Reports.
1834, 36, 37	Dr. Churchill,	1,700	11	Reports to June, 1840.
1836, 37, 38, 39	Mr. Warrington,	88	1	American Journal.
1838	Mr. Mantell,	2,510	3	Do.
1829				
		41,434	181	

b. Among French Practitioners.

Date.	Authors.	Total No. of Cases.	No. of Crotchet cases.	References.
1797 to 1809	Madame Boivin,	20,517	16	Memorial, p. 337.
1803 to 1811	Madame Lachapelle,	15,652	14	Prat. d'Accouch.p.500.
		36,169	30	

c. Among German Practitioners.

Date.	Authors.	Total No. of Cases.	No. of Crotchet cases.	References.
1801 to 1807	M. Richter, Moscow,	2,571	3	Velpeau.
1811 to 1827	Moschner and Kursak, Prague,	12,329	4	Siebold's Jour. vol 9
1812	Dr. Siebold, Wurtzburg	170	1	Do. vol. 1.
1818 to 1829	Do. Berlin,	97	1	Do. vol. 10.
1832	Do. Marburg, ...	155	1	Do. vol. 13.
1814 to 1827	Dr. Carus, Dresden,	2,908	9	Do. vol. 9.
1819	Dr. Ritgen, Giessen,	103	1	Do. vol. 6.
1825 to 1827	Dr. Kilian, Prague,	2,350	4	Velpeau.
1794 to 1804	Dr. Henne, Copenhagen,	500	1	Siebold's Jour. vol 2
	Dr. Naegelè, Heidelberg,	1,411	5	Velpeau.
1821 to 1825	Dr. Riecke,	219,303	84	Do.
1825, 26, 27	Dr. Klugè, Berlin,	809	8	Siebold's Jl. vols 7, 9
1825	Prof. Andrée, Breslau,	351	2	Do. vols. 7, 8.
1827	Dr. Küstner, Breslau,	176	2	Do. vol. 9.
1829	Dr. Adelman, Fulda,	57	1	Do. vol. 11.
1797 to 1837	Dr. Jansen, Ghent,	13,365	5	Med. Gazette, Mar. 6, 1840.
		256,655	132	

Thus, among British practitioners, we have 181 crotchet cases in 41,434 cases of labor—or about 1 in 228.

Among the French, 30 crotchet cases in 36,169—or 1 in 1205 $\frac{2}{3}$.

And among the Germans, 132 crotchet cases in 256,655 labors—or 1 in 1,944 $\frac{1}{2}$.

Added together, we have 334,258 cases, and 343 in which the crotchet was used—or 1 in 974 $\frac{1}{2}$.

TABLE II.—RESULTS OF THE OPERATION TO THE MOTHERS.

Authors.	No. of Crotchet Cases.	Mothers Died.
Dr. Smellie,	44	4
Mr. Perfect,	3	0
Dr. Jos. Clarke,	49	16
Dr. Granville,	3	3
Dr. Ramsbotham,	34	5
Dr. Maunsell,	5	2
Mr. Gregory,	2	1
Dr. Collins,	79	15
Dr. Beatty,	3	0
Dr. Churchill,	11	1
Mr. Warrington,	1	0
Dr. Siebold,	3	1
Dr. Ritgen,	1	0
Dr. Klugè,	8	3
Dr. Andrée,	2	1
Dr. Küstner,	2	0
Dr. Adelman,	1	0
	251	52

This table gives a mortality of 52 in 251—or about 1 in 5.

At first sight one would expect the mortality among the mothers to be less, after the use of the crotchet than the forceps; but the result of these investigations shews the reverse to be the case. The only explanation I can give is founded upon the natural unwillingness of every humane practitioner to destroy life—the consequence of which feeling, is the delay of the operation so long as there is a hope of evading it. This delay, however, is unfavorable to the mother, and when at length the operation is performed, although it may have been less severe than delivery by the forceps, yet her condition rendered her much more susceptible of injury from it.

The *comparative* advantages of the operation are very decided. In the cases we have supposed, the forceps is useless, and the natural powers inefficient; if, therefore, embryotomy were rejected as inadequate, the only *alternative* would be the Cæsarian section, the mortality of which is much greater, for 1 in $2\frac{1}{2}$ of the mothers are lost; and 1 in $3\frac{1}{2}$ of the children.

It would, however, be a serious omission if I did not notice another *alternative* operation, which, although not available after labor has commenced, may supersede the necessity for embryotomy in subsequent pregnancies. I allude to the induction of premature labor. In all cases where pelvic distortion renders craniotomy necessary at the full time, it becomes our duty to recommend the induction of premature labor in subsequent pregnancies, at such a period as shall, if possible, afford a chance of life to the child, or at least save the mother from a severer operation. The mortality among the mothers is about 1 in 50, and more than half the children are saved.

So much for the positive and comparative advantages of the operation. I am not aware that there can be any just *objections* against it, in suitable cases: but undoubtedly there are most weighty objections against it, when employed without careful consideration, and consultation. In fact, it ought to be deeply impressed upon every practitioner, that he who destroys the child, without due evidence that this is his only resource for saving the mother, is guilty of murder.

But it may be asked, when the responsibility is so serious, what evidence will be sufficient to satisfy a conscientious practitioner that he may not be committing a crime in his

anxious endeavour to afford relief? To this it may be answered :

1. That the continuance of strong labor pains for a certain time, without any advance of the head of the child, is so far evidence of a fixed obstacle to the passage of the child.

2. The failure of a cautious attempt to introduce the forceps, will, to a certain extent, demonstrate the amount of the disproportion between the head and the pelvis ; and the failure of a careful, yet firm attempt at extraction by the forceps, (when the application has been effected,) will prove that the disproportion cannot be remedied by compression.

3. A well educated finger will enable us in most cases to ascertain whether the diameters of the pelvis are such as will allow of the passage of a living child. And even though this mode be uncertain, we have a means of correcting our estimate, by comparison with the child's head, in apposition with the pelvis. If the natural efforts after several hours, or the forceps with a proper and safe amount of compression and force, cannot bring the widest part of the head of the child through the narrow part of the pelvis, we may fairly conclude that the only resource is craniotomy.

4. The general condition of the mother will also aid our decision. If she be much exhausted, if fever be present, the uterus powerless, the life of the child doubtful, and the success of the forceps dubious, we may shrink from inflicting the double shock of an unsuccessful application of the forceps, and subsequent delivery by the crotchet. But these cases are very rare ; they only happen when the patient has been mismanaged, and it requires experience and judgment to decide upon the propriety of terminating them by embryotomy.

A careful consideration of these circumstances will, I think, enable us to arrive at a correct conclusion in an individual

case ; and as the responsibility incurred in the destruction of the infant may lead to timidity, it should also be remembered, that hesitation to act when the case is clear, incurs a more fearful responsibility, by compromising the life of the mother.

The *cases* in which the operation is demanded are :

1. When the child is dead, and the labor tedious. But we must be quite sure that the child *be* dead, before this is made the ground of interference. If the head be putrid, and there is space in the pelvis, it is much better to use the forceps, as the bones and integuments of the skull give way so easily under the crotchet, that it is sometimes very difficult to extract the child. I have seen the operation prolonged two hours from this cause alone.

2. In distortion of the pelvis, when the antero-posterior diameter of the brim is less than 3 inches, we have no chance of delivery by the natural efforts or by the forceps ; so that to save the mother, we must destroy the child.

“ I presume that I have now satisfactorily proved the necessity and propriety of opening the head of the child at the beginning of labor, whenever the capacity of the pelvis is only $2\frac{3}{4}$ inches, or certainly less than three inches, from the utter impossibility of a child of ordinary size, at the full time, being born alive by any means, either of nature or art, through so small a pelvis.”*

3. When the transverse diameter of the lower outlet is diminished to the same extent by the approximation of the tubera ischii—if the forceps applied antero-posteriorly are

* Osborn's Essays on Midwifery, p. 223.

insufficient to move the head, we must have recourse to craniotomy.

4. When the calibre of the pelvis is diminished to a certain degree by a fixed obstacle—as, for example, a fibrous tumor, or an exotosis growing from the bone or periosteum, it may not be possible for the natural efforts alone, or aided by the forceps, to expel the child. In such cases it will be necessary to lessen the head, and apply the crotchet.

In these three latter classes of cases, the passage through the pelvis may be so much diminished as to render it necessary to break up the skull, or to eviscerate the child.

5. In some cases of ovarian disease, where the tumor has formed adhesions within the pelvis, so as to prevent its being pushed above the brim, it has been found necessary to lessen the head, before the child could be extracted. We are not, however, to decide upon this measure until the natural powers have had a fair trial, as it sometimes happens, that in the progress of labor the tumor is so much displaced as to allow of the passage of the child. Further, it will be worth while, before sacrificing the infant, to ascertain whether the contents of the tumor may not be drawn off, by passing a long trocar into it. If a small quantity of fluid escape, it may allow of the application of the forceps, and so enable us to save the child. If, however, the tumor prove to be solid and immoveable, we must, as a “*dernier ressort*,” have recourse to the perforator and crotchet.

6. When the child is hydrocephalic to such an extent as to prevent its entering or passing through the pelvis, whether distorted or of the natural size, there can be no question of the propriety of opening the head.

7. In some cases of convulsions, rupture of the uterus, &c. where immediate delivery is necessary, *and where the forceps cannot be applied*, craniotomy must be performed.

8. If an arm descend along with the head, the diameters

of which correspond closely to those of the pelvis, (whether the latter be of the usual size or not,) it may be necessary to terminate the labor by opening the head.

9. I have already alluded to a class of cases, where, from mismanagement, the patient has been allowed to continue too long without help, and in consequence is greatly exhausted, with fever, quick pulse, delirium, &c. In such cases, the patient will die if she be not assisted ; and from the unfavorable state in which she is, she cannot bear a prolonged or very painful operation. Now, if there be sufficient space for the forceps, they ought to be preferred, and it would be very wrong to use the perforator ; but if this be doubtful, and the probabilities against our succeeding with that instrument, then the consideration of the patient's inability to bear a severe operation may in some cases decide us in favor of embryotomy. These cases, however, are but few, and they must be well marked, to justify our adopting at once such extreme measures.

10. In footling or breech cases, when the head (separated or not from the body,) cannot be extracted, we must evacuate its contents.

The next question to be decided, is the *period of labor* at which the operation should be performed.

1. In all cases where the diminution of the pelvic diameters is so great as to render it impossible that a living child can be born naturally or extracted, there can be no hesitation in recommending that the head should be opened at an early period of the labor, say as soon as the os uteri is dilated or fully dilatable. By this means we shall afford a chance of the completion of the labor by the natural powers, as there can be no objection to waiting a few hours before extracting the child.*

* "Under such circumstances, the late Dr. Christopher Kelly informed

“If the pelvis measures two inches and upwards, to less than three inches from pubis to sacrum, and the head be opened in the beginning of labor, and the cerebrum discharged, by the collapsing of the bones, the volume of the head will be so much reduced as in all probability to admit, in time, of being forced into the pelvis by the powers of nature, by which means the application of the crotchet may perhaps be altogether avoided.”* If the head do not advance, we may then extract.

It should always be remembered, that it is an important object to shorten the duration of suffering, as by so doing, the danger to the mother will be diminished.

2. When the distortion is less, we cannot be sure as to the result of the natural efforts, and we must wait until it is evident that they are inadequate ; then an endeavour should be made to use the forceps, and if this fail, there should be no delay in the performance of embryotomy.†

3. These observations will apply equally to the case of morbid growths, ovarian disease, &c. obstructing the passages.

me—and I believe the practice originated with him—that he had left the head of the child, after the evacuation of its contents, for more than 24 hours, without making any artificial attempts to extract it, and that the operation was by this delay rendered more safe, and infinitely more easy. The late Dr. Mackenzie also informed me, and many other persons, that he had in the latter part of his life followed this practice with success.”—*Denman*, p. 308.

The same practice has been recommended also by Boer and Asdrubali. I cannot but agree with Dr. Ramsbotham, that this delay is very hazardous ; sometimes we can afford to wait, if the operation be performed early, but if we defer extraction too long, we subject the patient to all the risk of a prolonged second stage. This opinion is also advocated by M. Dugès.

* Osborn's Essays on Midwifery, p. 221.

† I have already stated, and I repeat it here, that in cases where the head *cannot* descend into the pelvis, all the symptoms of a prolonged second stage will occur, if the patient be not delivered. The limit between the first and second stages, appears to be marked by the *dilatability* of the os uteri.

4. In cases of convulsions, ruptured uterus, &c., the time for the operation is determined by circumstances connected with those accidents, and which will be found laid down in works on the subject.

5. In the mismanaged cases to which I have alluded, the condition of the woman, which determines the necessity for the operation, will also point out the importance of promptitude. If the case be so bad that we dare not risk a failure with the forceps, it is clear that we cannot afford to delay embryotomy.

Mode of operating.—It is not absolutely necessary to the operation that the os uteri should be fully dilated, though it is a great advantage, and greater care will be required when this dilatation has not taken place.

The rectum and bladder are first to be evacuated; the patient is then to be placed on her left side, with the hips over the edge of the bed, and an assistant beside her, to fix and steady the abdomen.

One or two fingers of the left hand are then to be introduced into the vagina, and their extremities fixed upon that part of the head of the child which is to be perforated. Contrary to ancient practice, this should never be the sutures, because after the incision is made in that situation, the bones collapse and close it. Having determined upon the situation, the perforator is to be passed along close to the palm of the hand and the inside of the fingers, so as to avoid injury to the soft parts of the mother.

Having arrived at the point of insertion into the skull, it is to be pressed firmly forwards with a semi-rotatory motion, until it pierce the bone; it is then to be passed in up to the shoulders, and the handles are to be separated by an assistant as widely as possible. The cutting edges of the scissors are

then to be placed at right angles with the first incision, and again separated, so as to make a crucial incision.*

This being effected, the perforator is to be passed into the skull, the brain thoroughly broken up, and the medulla oblongata cut across.

The scissors are then to be withdrawn, and the first part of the operation is completed.

The left hand is again to be introduced, as a guide and guard to the crotchet, which should be passed into the cranium for the purpose of completely breaking up the brain. I dwell upon this point, because instances are on record of the child being born alive after the operation of craniotomy,† to the disgrace of the operator, and the distress of the patient and her friends. When this object is attained, if we wish to terminate the operation at once, the crotchet may be fixed on the outside or inside of the head; the former was adopted by the older practitioners, but the latter is recommended generally at present.‡ In some cases it is useful to employ two crotchets—one internally and the other externally.

* Denman's Introduction, p. 306.

† Osborn, Essays on Midwifery, p. 235. Burns' Midwifery, p. 499. Med. Chir. Trans. vol. 12.

“Let the demolition be complete—let the brain be converted into a perfect pulp; feel what reluctance you may before you begin this terrible operation—the more the better—but when you have once begun, proceed promptly, without flinching—it is too late to turn back. In demolishing the brain, it is desirable that you should break up the basis as early as practicable—for this part, I suspect, is more immediately connected with vitality. . . . Never lay the head open, unless there be an absolute need for it; but when you do, when you must craniotomize, let all your operations be effectually performed.”—*Blundell*, p. 538.

‡ “Some have thought that it was of great importance to fix the crotchet on the outside of the head, and others have insisted on the propriety and superior utility of fixing it in the inside; but I am persuaded that such things are of little consequence, and that in the course of a difficult operation, it may be found necessary and useful to fix it in either way.”—*Denman*, p. 311

The scalp should be carefully folded over the edges of the bones, in order to prevent injury to the passages, and then extracting force must be gradually and steadily applied during the pains, or at intervals, in imitation of them.*

The left hand should be passed into the vagina, and placed on the head, opposite to the insertion of the crotchet, both for the purpose of steadying it and of preventing mischief if the instrument should slip. If the part of the skull in which the crotchet is fixed give way, we must obtain another purchase.

The amount of force, and its continuance, will depend of course upon the resistance to the passage of the child, but if after a certain time no progress be made, in order to avoid contusion of the soft parts of the mother, it will be well to break up the skull with the forceps adapted for that purpose.

The perineum must be carefully guarded, and care must be taken that no injury be inflicted by the spiculæ of bone.

After the head is extracted, the body generally follows without much difficulty; but should this not be the case, we must have recourse to evisceration. The seissors must be plunged into the chest, and the contents broken up; the crotchet hooked upon the ribs, and traction exerted. The contents of the abdominal cavity may be evacuated in a similar way, and after this we shall generally be able to extricate the child.

The principal *difficulties* of the operation are as follows:

1. If the bones of the skull be very firm, it is not easy to

* "One common error formerly prevailed in this, and too many other surgical operations, founded on an opinion that it was needful to perform it speedily; but it is now proved by experience, and generally acknowledged, that the more calmly and slowly we proceed, the less chance there will be of doing mischief."—*Denman's Introduction*, p. 305.

perforate, and the point of the scissors is very apt to slip. This can only be avoided by great care and steadiness.

2. A similar state of the bones will offer a serious obstacle to the insertion of the point of the crotchet; but a little perseverance will in most cases overcome it. The fingers of the left hand placed on the outside of the skull, will render it still more easy.

3. The extraction may be difficult. If the narrowing be not too great, the difficulty may be overcome by steady force; but if such a degree as may be exerted with impunity do not move the head, we must then break up the skull, as already stated.

The *dangers* to which the patient may be exposed in this operation, are more serious than when the forceps is used.

1. The perforator may slip, and the vagina or uterus be wounded.

2. The hook may slip, or the bone in which it is fixed may suddenly give way; and if the hand of the operator be not interposed, a severe or even fatal rent may be inflicted.

3. The perineum may be lacerated by the injudicious exertion of extracting force.

4. From the condition of the patient, she generally suffers more from the shock to the nervous system, than in the operations previously described.

5. There is also greater danger of subsequent inflammation of the womb or vagina, with perforation of the bladder, especially if much force have been necessary.

After-Treatment.—The nervous shock will best be remedied by quiet, small doses of opium, and moderate stimulation.

The state of the vagina and uterus should be carefully

watched, and vaginal injections of warm water used occasionally.

If any symptoms of inflammation arise, they must be met promptly by the appropriate remedies—venæsection, leeching, calomel and opium, &c.

In other respects, if the patient go on well, she must be treated as after natural labor.

ESSAY VI.

ON THE CÆSARIAN SECTION.

SECTIO CÆSAREA. SECTIO AGRIPPINA. HYSTEROTOMY. HYPO-
GASTRIC SECTION, &c.

L'Operation Cæsarienne, Fr. Kaiserschnitt. Bauchschnitt. G.

So far, I think, our investigations have fully borne out an observation made in the first of these Essays, viz., that obstetric operations formed an ascending series—each one exceeding the other in importance and danger; and that whilst no two could be compared in terms of equality, the value of each was shewn by its alternative, which is always one of greater danger. Thus the mortality of premature labor is less than its alternative, the crotchet—that of the forceps less than the crotchet; and we shall now see that inasmuch as when it is employed early, the safety of the mother is nearly secured, the danger of embryotomy is far less than that of the cæsarian section. This operation is

indeed the "*dernier ressort*" of midwifery. Preferable as it is to the certain death of both parties, it is far more serious in its consequences than any other operation. It comes under the class of operations already noticed, in which the life of mother and child are necessarily more or less compromised.

It is of very ancient date, being known to the Greeks, and called by them *υστεροτομοτοκίε*, or *εμβριοεληκη*, but I believe by them only employed after the death of the mother.

From the circumstances of several remarkable personages having entered the world in this way, it was deemed fortunate to be so born—a royal road, in short, to distinction.

Pliny has recorded that Scipio Africanus was thus extracted. He says, "*Auspiciatus enecta matre nascuntur, sicut Scipio Africanus prior natus.*"* He is not correct, however, in stating that Scipio was the first thus brought into the world; Claudius Cæsar, who distinguished himself in the war with the Samnites, having preceded him.

From being thus 'cut out' of their mother's womb, these individuals were first termed 'Cæsones,' afterwards 'Cæsares,' on the authority of Pliny,† Festus, Pompeius,‡ Solinus,§ &c. "*Quia cæso matris utero in lucem prodissent.*"

Cæso Fabius, who was three times Consul, was thus extracted.||

Julius Cæsar is also stated to have been brought into the world by means of this operation, although it is an error to state that the name Cæsar was given to him on this account, inasmuch as he inherited it from his father.

* Lib. 7, cap. 9.

† Ibid, cap. 16.

‡ Lib. 3.

§ Cap. 4.

|| Livy, Dec. 1, lib. 2.

Among the ancients, persons thus born were considered sacred to Apollo, to which Virgil alludes in the lines,

“Unde Lycham ferit exsectum jam matre peremtâ
Et tibi Phœbe sacrum.—ÆNEID x. 315.

Thus Æsculapius was called the son of Apollo, because (it is said) he was brought into the world by hysterotomy.

For this reason also, those things in Rome which were sacred to Apollo, were preserved by the family of the Cæsars.

Some modern historians have included Edward VI. King of England, among those who benefitted by this operation, and this statement is repeated in some works on midwifery. I have taken some trouble in tracing this story, and I find no reason to believe it to be true. Sir John Hayward, in his “Life and Reign of Edward VI.” was the first to put it upon record. He says, “All reports do constantly run that he was not by natural passage delivered into the world, but that his mother’s body was opened for his birth, and that she died of the incision the fourth day following.”*

That the latter statement is inaccurate, is proved by an examination of a MS. of the ceremonies of her funeral. Queen Jane Seymour died Oct. 24, 1537, twelve days after King Edward’s birth. With regard to the mode of the king’s entrance into life, I shall quote the words of the compiler of these memoirs. In the notes he observes that Sir John Hayward was the first to record the fact, “for none of our historians that wrote before Hayward, give any countenance to this, but only mention her departure soon after, except it be Sanders,† (whose pen was not directed so much by truth

* Complete History of England, vol. ii. p. 273. 1706. This history consists of the ‘Life and Reign’ of different kings, by various authors, with comments by the editor.

† De Schismat. Anglican.

as malice,) who frames a story, that when the Queen was in extreme labour, they asked the King whom he would have spared—the Queen or his son? He answered his son, because he could easily find out other wives. But yet even he has not a word of cutting the young infant out of his mother's belly." This story is manifestly fabulous, inasmuch as the fact of the infant being a son could not be known before its birth, and otherwise the point intended by it would be without force, inasmuch as he had already a daughter. The commentator adds, "that Dr. Burnett (now Bishop of Salisbury,) mentions original letters in the Cotton Library, that shew how the Queen was well delivered. These letters are exemplified in Fuller's Church History, the one from the Queen herself, and the other from her Physicians, both written to the Privy Council."*

This evidence, I conclude, sets the question at rest, and I ought perhaps to apologise to my readers for occupying so much time with it; but it appeared to me to be as well to ascertain the truth about it.

There is a tradition that Robert II. King of Scotland, was born by the Cæsarion section, an accident having happened to his mother. I am indebted to the politeness of a gentleman in Paisley, for an account of this occurrence, and I shall take the liberty of appending an extract from his letter.†

* Complete History of England, vol. ii. p. 273, note.

† "Margery, the only daughter of Robert Bruce, attended the services in connection with the celebration of Shrove Tuesday, in Paisley Abbey, on 2d March, 1316. After they were concluded, she was riding down to Renfrew, where the principal residence of her husband, the Lord High Steward, was. Before she had quitted the fair domains of the Abbey, at a hill called 'the Knoe,' her horse stumbled and threw her—she was severely injured, and was immediately seized with the pains of childbirth. In this distressing dilemma, there was one of her followers, Sir John Forrester, of Allieston, near Lochwinnoch, a vassal of the Stewards, 'who before that' (to quote the

To return to the regular history of the operation.

Rousset, about 1581, published a treatise on the Cæsarian section, in which he quotes ten successful cases. On one of the patients the operation was performed six times; she became pregnant a seventh time, and no one being willing to operate, she died undelivered. His essay was translated into Latin by Bauhin, 1661, and may be found in Stach's Collection.*

To this work of Rousset's, Bauhin added an appendix of cases; † he states that he saw the operation performed seven times.

There is no doubt that in many of these cases the operation

remark of the quaint old narrator,) 'was reputed a simple man,' in virtue of having acquired some surgical skill in the wars, was entrusted by her retinue with the performance of the Cæsarian operation, which was found to be the only chance for saving the child; so far as delivering the child alive, he proved quite successful, but either through inexperience, or from the state of the patient, he injured one eye of the child in such a manner as that it retained a red and inflamed appearance, which in after years, was greatly heightened by the effects of a severe inflammation. The description given of it by Froissart was '*rouges rebrasses, il sembloit de sendal.*' The unfortunate mother expired on the spot, and was, with full array of funereal pomp, in due time, laid in a vault (now occupied as the burying-place of the Marquis of Abercorn) below a small chapel, commonly known, on account of its remarkable echo, as the 'sounding aisle.'

"This child, thus strangely born, became a regent of Scotland, and ended his eventful and glorious life as King Robert the 2nd—the first of the Stewarts who occupied the Scottish throne. In consequence of his appearance, as the custom of distinguishing Sovereigns of the same name by their order of succession was not introduced, and as they were generally distinguished by a name derived from their appearance, so he was styled 'King Blear-eye,' contracted into 'King Blearie.'" Authorities—"Crawford's Renfrewshire;" "Renfrew, by the Laird of Greenock, and James Montgomery, of Westlands;" "Hamilton of Wishaw's Chronicles," continued by the late W. Motherwell, for the Maitland Club, &c. &c. It is but fair to add, that this story is not credited by Sir D. Dalrymple and others.

* *Authores de Morbis Mulierum*, p. 448. La Motte's Midwifery Trans. p. 268.

† *Ibid.* p. 480.

was unnecessary ; but I do not see ground for Mauriceau's assertion that "that which Rousset reports of the Cæsarion section is nothing but the ravings, capriciousness, and imposture of their authors."*

There is no mention of the operation in Raynalde's Work on the 'Byrth of Mankinde,' (1634), nor in the 'Childbearer's Cabinet,' so that we are indebted to the French and Germans for our earliest information on the subject.

Ambrose Parè, whose work was translated in 1634, (having been written in 1570) was opposed to the performance of the operation on the living woman, on account of the danger of hemorrhage, but recommends it for the purpose of saving the child when the mother has died suddenly.

In the translation of Guillemeau's work, 1635, there is a chapter on the Cæsarion Section, which is recommended immediately after the death of the woman, "that thereby the child may be saved, and receive baptism." "In some women," the author observes, "I have made this practice very fortunately, and among the rest, in Mad. le Mabre, M. Phillippes my uncle being joined with me ; and likewise in Mad. Pasquier, presently after she was dead, Mons. Paræus and the Curate of St. Andrew, being present." As to performing it on living women in difficult labors, he says, "Which for my owne part I will not counsell any one to do, having twice made triall of it myselfe, in the presence of Mons. Paræus, and likewise seene it done by Mons. Viart, Brunet, and Charbonnet, all excellent chirurgions, and men of great experience and practice, who omitted nothing, to do it artificially and methodically. Neverthesse, of five women in whom this hath been practised, not one hath escaped. I know that it may be alledged that there be some that have

* Midwifery, translated by Chamberlen, p. 240.

been saved thereby ; but though it should happen so, yet ought we rather to admire it, than either practice or imitate it.” “ After Mons. Paræus had caused us to make trial of it, and seene that the success was very lamentable and unfortunate, he left and disallowed this kind of practice, together with the whole Colledge of Chirurgions of Paris.”*

In Chamberlen’s Translation of Mauriceau (1672), we find a strong protest against performing the operation on living women, and great doubts expressed as to its having ever been successful. He admits its utility when the mother is dead.†

Dionis, whose work was translated in 1719, has a chapter on the Cæsarian section, which he recommends when the woman is dead, but deprecates during her life. He describes the operation minutely.‡

Sir F. Ould, 1742, is the first British author I possess who notices the operation, which he says may be performed “ either while the mother is living, or after her death, according to the nature of the circumstances.” Nevertheless, he observes that the “ Cæsarian operation is most certainly mortal, as we shall endeavour to prove presently from reason and the nature of the thing ; and I hope it will never be in the power of any one to prove it by experience.” This conclusion is based on the assumption of the universal mortality of punctured wounds of the belly, and the certainty of hemorrhage from the vascular condition of the womb. He does however admit of one possible exception, viz. “ where the pubis and sacrum are so preternaturally near each other, that the operator’s hand cannot pass between them, in order to come at the child.”§

* Page 188.

† Page 239.

‡ A general Treatise of Midwifery, p. 253.

§ A Treatise of Midwifery, p. 437.

La Motte's work was translated in 1746. He neither discredits the cases related by previous authors, nor doubts the possibility of success; but he observes, "the os sacrum, ischium, and pubis, being from their first conformation so close to one another, that the surgeon can hardly introduce a few fingers between them, it being consequently impossible for the child to come through, is the only case where this operation is to be put in practice."

Burton, in 1751, entered into a more minute detail than any of his predecessors, and gives references to cases. He concludes that "seeing, therefore, both reason and repeated experience confirm the possibility of success in this operation, nothing should deter a skilful operator from performing it when it is absolutely necessary."*

Smellie, 1751, takes, as usual, a sound common sense view of this matter: "When a woman," he observes, "cannot be delivered by any of the methods hitherto prescribed and recommended in laborious and preternatural labors, on account of the narrowness or distortion of the pelvis, into which it is sometimes impossible to introduce the hand; or from large excrescences and glandular swellings, that fill up the vagina and cannot be removed; or from large cicatrices in that part and at the os uteri, which cannot be separated; in such emergencies, if the woman is strong and of a good habit of body, the Cæsarion operation is certainly advisable, and ought to be performed; because the mother and child have no other chance to be saved, and it is better to have recourse to an operation which hath sometimes succeeded, than leave them both to inevitable death."†

Pugh, 1754, briefly describes the operation, and observes

* A new System of Midwifery, p. 272.

† Midwifery, vol. i. p. 239, 6th Ed.

that "it certainly cannot be warrantable, neither ought to be done, as there must be great danger in it, but when there is an absolute impossibility of delivery in any other way; and this is the only chance the mother and child have of being saved."*

Neither Giffard, 1734, Chapman, 1773, Exton, 1751, Nihell, 1760, nor Memis, 1764, mention the operation.

Cooper, 1766, gives a short notice of it. Moore, 1777, omits it.

Dr. Alex. Hamilton, 1775, admits that when the pelvis is only $1\frac{1}{4}$ in antero-posterior diameter, that we must have recourse to the Cæsarian section, but he deprecates it in all other cases except where the mother is dead.†

Dr. Foster, 1781, recommends it after the death of the mother.

Mr. Dease, 1783, is not favorable to the operation, though he expresses himself cautiously. He very justly remarks, that many of Rousset's cases were subjected to the operation unnecessarily, inasmuch as they afterwards bore children in the natural way.‡

Dr. Aitken, 1784, gives a short sketch of the operation, with some original suggestions.§

Dr. Osborn, 1762, in his advocacy of the crotchet, assumes that it may in all cases supersede this operation.||

Dr. Denman enters very fully into the subject, and states that distortion of the pelvis, and the sudden death of the mother, are the only grounds for it.

In the year 1769, Mr. Wood, of Manchester, performed the operation on a female, whose pelvis had become greatly

* A Treatise on Midwifery, p. 107.

† Outlines of Midwifery, p. 322.

‡ Observations in Midwifery, p. 64.

§ Principles of Midwifery, p. 81.

|| Essays in Midwifery.

distorted by mollities ossium, after bearing several children : and published the case.*

Mr. Simmons, who had been consulted about the case previously, published a critique upon it,† and opposed the operation. Afterwards he wrote directly against Mr. Wood.‡ In the same journal Mr. Ogden took up the cudgels in favor of Mr. Simmons, and opposed the operation under any circumstances.§

Shortly afterwards, Dr. Sims, of London, published a letter to Mr. Simmons, modifying his views ;|| and Mr. Tomlinson, of Manchester, followed to the same effect.¶

Mr. Simmons then expanded his letter into a pamphlet,** which was most ably answered by Dr. Hull, of Manchester.††

This led to a rejoinder on the part of Mr. Simmons,‡‡ and a reply from Dr. Hull,§§ and here the dispute ended.

Much benefit arose from this controversy, although it began in an unjust attack upon Mr. Wood. The true grounds for the operation were ascertained, and much information elicited upon the subject of distortions. Dr. Hull's two letters contain correct views and sound practice.

Dr. Hull translated Baudelocque's work on the Cæsarian section, which was a valuable accession to our knowledge on this subject. I regret that I cannot enter upon an analysis

* Mem. of Med. Soc. vol. v. p. 463.

† Med. and Phys. Journal, vol. ii. p. 231.

‡ Ibid, p. 427.

§ Ibid, p. 476.

|| Ibid, p. 433.

¶ A letter to Mr. Ogden. Manchester, 1799.

** Reflections on the propriety of performing the Cæsarian operation.

†† Defence of the Cæsarian operation. 1798.

‡‡ Detection of the fallacy of Dr. Hull's defence.

§§ A second letter to Mr. Simmons.

of Dr. Hull's learned works in this place ; but I cannot omit recommending them to my readers, as well as acknowledging my own obligations to them.

The operation has been noticed by almost all subsequent writers. More or less information will be found in the works of Johnson,* John Clarke,† Burns,‡ Dewees,§ Merriman,|| Ryan,¶ Gooch,** Conquest,†† Hamilton, jun.‡‡ Campbell,§§ Maunsell,||| F. H. Ramsbotham,¶¶ Ashwell,*** Blundell,††† &c., besides monographs scattered throughout the periodicals.

Among the French, we find the operation noticed by the following authors :

Charles Etienne, according to Lauverjat, was the first who wrote scientifically upon this subject. His work was published in 1546.

We have seen that Ambrose Parè and Guillemeau opposed it.

Rousset, in 1581 published his "*Traité sur l'Hysterotomie ou l'Enfantement Cæsarien*," which was translated into Latin by Caspar Bauhin, and is included by Stach among his "*Authores de Morbis Mulierum*."

* New System of Midwifery, 1769, p. 303.

† London Pract. of Midwifery, p. 508.

‡ Principles of Midwifery, p. 508.

§ Compendium of Midwifery, p. 592.

|| Synopsis, p. 171.

¶ Manual of Midwifery, p. 593.

** Lectures, p. 225.

†† Outlines of Midwifery, p. 133.

‡‡ Outlines, p. 60.

§§ Midwifery, p. 260.

||| Dublin Practice of Midwifery, p. 139.

¶¶ Lectures Med. Gaz. June 21, 1834, p. 401.

*** On Parturition, p. 402.

††† Principles and Practice of Obstetricy, p. 562.

Peu, 1694, gives a good description of the mode of operating, and admits the propriety of performing it after the death of the mother, to save the child, but opposes it when the mother is living. He says, with great 'naïveté': "Je ne l'aie point faite et je n'aie point envie de commencer. Fraie le chemin qui voudra, je ne veux marcher que sur les pas d'un autre qui en soit honorablement sorti."*

In 1704, Rureau de Xaintes published a treatise upon the subject, with cases.

Mauriceau, 1715, opposed it altogether, and Dionis admits it only upon the death of the mother.

La Motte, 1726, however, differed from them, as we have seen, and recommended its performance during life, if circumstances called for it.

In 1751, Levret, in his "*Traité des Accouchemens Laborieux*," entered into a detailed examination of the operation, and suggested several modifications of it. He limits the grounds of the operation to two—great deformity of the pelvis, and extra-uterine fœtation.

Jacques Mesnard, in "*Le Guide des Accoucheurs*," 1753, has a chapter upon it.

Puzos, 1759, does not notice the subject.‡

Astruc, "*L'Art d'Accoucher*," 1766, gives a good history of the operation, adopting the views of Levret.

Deleurye, "*Traité des Accouchemens*," 1770, recommends the operation (when determined upon) to be performed as early as possible.

Jacob, "*Ecole pratique des Accouchemens*," 1785, enters more fully into the cases which may justify the operation.

* *La pratique des Accouchemens*, p. 336.

† *Traité des Accouchemens*.

‡ *Traité des Accouchemens*.

All these authors recommend a vertical incision—some in the *linea alba*, others outside the *rectus muscle*.

In 1788, M. Lauverjat published an elaborate and valuable treatise on the *Cæsarian section*, and a comparison between it and the *Sigaultian operation*. He treats of vaginal and abdominal *hysterotomy*, and admits a greater number of cases requiring the operation than preceding authors. He claims to be the first in Paris who made the incision in the *linea alba*, and also the first who made it transversely, instead of vertically, in certain cases of distortion. So far from fearing hemorrhage, he expressly advises the escape of a certain amount of blood. He is the first who objects to cutting through the after-birth.

M. Baudelocque, "*L'Art des Accouchemens*," was published in 1781, and in 1796 was followed by his memoirs on the *Cæsarian section*, containing the results of his researches. This work is of great value, and will amply repay the perusal.

About the year 1800, M. Saccombe published his "*Elemens de la Science des Accouchemens*," repudiating the operation under any circumstances, by "twenty-six facts," about as true as the motives he assigns to its advocates.

More or less information will be found in the works of Dufot,* Boivin,† Maygrier,‡ Capuron,§ Gardien,|| Velpeau,¶ &c. &c.

Among the Germans, I may refer the reader to the following

* *Principes sur l'Art d'Accoucher*, 1775, p. 252.

† *Memorial*, Ed. 1817, pp. 303—388.

‡ *Elemens de l'Accouch.* 1814, p. 420.

§ *Principes de l'Art d'Accouch.* p. 550.

|| *Traité des Accouchemens*, vol. iii. p. 18, et seq.

¶ *Traité complet. des Accouchemens*, p. 451. Brussels Ed.

Henckel,* 1770, Boer,† 1790, Spiering,‡ 1801, Steidele,§ 1814, Ritgen,|| 1820, Osiander,¶ Froriep,** Carus,†† Joerg,‡‡ Busch,§§ Rosshirt,|||| Kilian,¶¶ &c.

The question is entertained affirmatively by all these writers, and by some it is treated with a detail and accuracy which are extremely valuable. The works of Boer, Osiander, and Kilian, are beyond praise.

Besides the notice of the operation in systematic works, there are many detached essays of great merit.

Weidmann, in 1779, published a comparison between this operation and symphyseotomy, in which he has collected a number of cases; and Michel, in his treatise *De Synchronotomia*, 1784, has added to the list.

Naegelè published the history of a case, in which this operation was rendered necessary by a peculiar deformity of the pelvis,*** and Busch the history of two unsuccessful cases.†††

In 1833, Michaelis published the account of a woman on whom the operation had been performed three times

* Abhandlung von der Geburtshülfe, &c. p. 426.

† Natürliche Geburtshülfe, &c. vol. i. p. 181.

‡ Die pratische Geburtshülfe, 1801, p. 326.

§ Abhandlungen von der Geburtshülfe, vol. iv. p. 94.

|| Die Anzeigen der Mechanischen Hülfen, &c. p. 447.

¶ Die Ursachen und Hülfsanzeigen der Geburten, vol. iii. p. 433.

** Handbuch der Geburtshülfe, p. 481.

†† Gynæcologie, vol. ii. p. 348.

‡‡ Handbuch der Geburtshülfe, p. 519.

§§ Lehrbuch der Geburtskunde, p. 635.

|||| Die Anzeigen zu den Geburtshülflichen Operationen, p. 179.

¶¶ Die Operative Geburtshülfe, vol. ii. p. 776.

*** Einfahrungen und Abhandlungen, &c., p. 409.

††† Geburtshülflichen Abhandlungen, p. 168.

successfully, (she has since recovered from a fourth,) with an essay containing a collection of cases,* from which I have extracted largely.

After this short sketch, we may proceed to consider the operation itself, its object, and the means for attaining it.

The *objects* of this very formidable operation, are of extreme importance.

1. To afford a chance of escape to the mother, and of life to her offspring, in cases where the child cannot be extracted through the natural passages by any means at our command.

2. To extract the child so promptly, as to afford it a chance of life, when the death of the mother has taken place suddenly.

3. To relieve the mother from the risk of fatal inflammation, owing to the presence of the foetus in the abdominal cavity, acting as a foreign body.

The *nature* of the operation by which these objects are to be effected, is simple, viz., that of cutting through the abdominal and uterine parietes, so as to come at the child, and then removing the entire contents of the uterus, and closing the external incision by sutures and sticking plaster.

But though so simple, it is most dangerous. Wounds of the peritoneum of the simplest kind, though not necessarily and invariably fatal, are very frequently so. In most cases, inflammation of the serous membrane has followed, and in very many it has terminated in death. There is another source of danger. If the wound in the uterus should not be completely closed by its contraction, hemorrhage to a fatal amount, from the uterine sinuses, may occur,

* Abhandlungen aus dem Gebiete der Geburtshülfe, pp. 3, 34.

though it is not so frequent as was supposed by the earlier writers.

This appears to have been the cause of death in the case related by Dr. Cooper and Mr. Thomson.*

The formidable nature of the operation, however, only makes it the more necessary to ascertain clearly the grounds upon which the operation is justifiable. It is sufficiently evident, from what has been already stated, that the older practitioners performed it unnecessarily; this is proved, I say, by the fact that the same woman bore children afterwards without assistance. Now it is an established axiom in midwifery, that the mother's life is not to be compromised in order to save the child. A certain amount of risk may be fairly incurred, but beyond this, the safety of the mother is to be preferred, and if necessary the child sacrificed. In no cases where the mother's security can be so purchased, can we be justified in having recourse to the Cæsarion section; but there are cases on record, where the pelvic outlets are so narrowed by distortion, that a mutilated child could not be dragged through.†

In Mr. Thomson's case, the antero-posterior diameter of the upper outlet, was only $\frac{7}{8}$ ths of an inch. In Dr. Cooper's second case, it was $1\frac{1}{4}$, and the transverse diameter of the lower outlet, only $\frac{1}{2}$ an inch. In Dr. Young's case, the antero-posterior diameter of the upper outlet, was $1\frac{1}{4}$ inches.

* Med. Obs. and Enq. vol. iv. p. 261.

† But if the cavity of the pelvis be so far closed, that it should in any part very little exceed one inch, of which examples have sometimes occurred, we might then presume that the head of a child, though it were reduced to the least possible size, could not be extracted through it; and then the necessity and propriety of performing the Cæsarion operation would be allowed, whatever aversion we might have to it, especially if we had reason to think that the child was living, or to conclude that it was not dead.—*Denman's Introduction*, p. 531.

In a skeleton in Dr. Hamilton's possession, it was only $\frac{3}{4}$ ths of an inch.

In one of Dr. Hull's cases (Ann Lee), the conjugate diameter, taken from the symphysis pubis to the projection of the sacrum, was $1\frac{1}{8}$ inches, and from the acetabula to the projection of the sacrum, $1\frac{9}{16}$ ths in. on each side. In the other case (Isabel Redman), the passage was narrower, though the deformity was different.

"Out of 80 cases, the operation was necessitated by narrowness of the antero-posterior diameter of the pelvis in 62.

Thus it was 1 inch in 1 case.

$1\frac{1}{2}$,, in 8 cases.

$1\frac{1}{2}$ to 2 ,, in 23 ,,

2 to $2\frac{1}{2}$,, in 25 ,,

$2\frac{1}{2}$ to $2\frac{3}{4}$,, in 5 ,, (*Velpéau*.*)

It is quite plain that a fœtus ever so much mutilated, could not pass through some of these pelves, nor through any without great efforts.

Dr. Osborn, who was extremely cautious, and had a great horror of this operation, has fixed $1\frac{1}{2}$ inch antero-posterior diameter, by 3 transverse, as the smallest space through which a child, after evacuation of the contents of the cavities and the breaking up of the cranium, could be extracted by the crotchet; but others have deemed this impossible.†

* *Traité des Aceoueh.* p. 457.

† "If the basis of the head can only be reduced by the operation of embryuleia to the width of an inch and a half when turned sideways, I cannot conceive that when joined to the body of a child, it can be drawn through an aperture of the same width, even in its whole extent, much less on either side of the sacrum, for the neck must add somewhat to the volume of the head."—*Hamilton's Letter to Osborn*, p. 134.

"I must moreover inform you, that I do not admit the possibility, much less the safety, of the extraction of a full grown fœtus through a pelvis, the

Certainly great risk of injury to the soft parts of the mother, would be incurred by the force necessary to drag the fœtus through so small a space, not quite, perhaps, but nearly equal to that resulting from the Cæsarian operation.*

We may, therefore, safely conclude that when from any cause the antero-posterior diameter of the upper outlet, or the transverse diameter of the lower, is not more than $1\frac{1}{2}$ inches, there is no possibility of delivery “per vias naturales,” but that we must have recourse to the Cæsarian section.†

But it may fairly be asked, what chance does so serious an operation afford to either mother or child? The only mode of answering this question, is by adducing the cases on record.

The following are taken chiefly from the researches of MM. Simon,‡ Hull,§ Baudelocque,|| Velpeau,¶ and Michaelis,** with additional cases from the periodicals:

widest part of which is not more than one inch and a half in diameter.—Hull's 1st Letter to Simmons, p. 118.

* Burns' Midwifery, p. 54.

† Johnson's New System of Midwifery, p. 304.

‡ Mem. de l'Acad. Roy. de Chir. vol. i. pt. 3, p. 210.

§ Second Letter to Mr. Simmons, p. 276.

|| On the Cæsarian section, translated by Dr. Hull.

¶ Traité de l'art des Accouchemens.

** Abhandlungen aus dem Gebiete der Geburtshülfe, p. 34, et seq.

TABLE I.—SUCCESSFUL CASES.—BRITISH PRACTICE.

No.	Date.	Operator, or Authority.	Patient's Name.	Hours in labor.	Cause.	Results to Mother.	Results to Child.	References.
1	1739	Mary Dunally, Midwife,	Alice O'Neal	12 days	.. ..	rec.	dead	Ed. Med. Essays, vol. v. pt. 1, p. 439.
2	1757	Mr. Bell,* Galloway, Ireland	...	...	Ex. ut. foetation distortion	rec.	dead	MSS.
3	1793	Mr. Barlow ..	Jane Foster	5 days	...	rec.	dead	Med. Rec. & Resear. p. 154.
4	1822	Mr. Cullen, New York	...	...	distortion	rec.	saved	N. York Jl. Mar. 1823
5	1827	Dr. Richmond, Ohio, Amer.	...	...	.. ..	rec.	saved	Western Med. Jl. Nov 1827.
6		Mr. Knowles, Manchester	...	...	.. ..	rec.	...	Trans. of Prov. Assn. vol. iv.
7	1833	Mr. Greaves, Rockingham	...	...	distortion	rec.	saved	Lancet, 1833-4, p. 148
8	1835	Mr. Gibson, N. York, Amer.	...	...	.. ..	rec.	saved	Amer. Jl. of Med. Science, May, 1835.
9		Dr. Fox ..	...	...	.. ..	rec.	saved	Lancet, Mar. 28, 1840
10		Ditto ..	...	...	.. ..	rec.	saved	Ditto, 1833-4, p. 148.
11		Dr. Wright ..	...	...	.. ..	rec.	...	...

† I am indebted to my friend, Dr. Aquila Smith, for the following "account of the Casarian Operation, performed in Galloway, in Ireland," which was read at the meeting of the Medical and Philosophical Society, Dublin, on Thursday, September 1, 1757 :—"The 25th of last month, (July, 1757,) the Casarian operation was performed by Surgeon Bell, Jun. on a poor woman in Galloway, and the bodies of two children, which were mostly decayed, so as that scarcely any thing but the bones remained, were extracted, and the woman is now entirely out of danger. Her case is the more extraordinary, as she was emaciated to the last degree, and hectic, having carried the dead bodies 12 months or more after she came to her full time, and during that space had been in the last stage of an ascites, the water of which was discharged by the navel. There were five physicians and surgeons present, all of whom agreed to the performance of the operation."—*Copied from the Newspapers of that time.*

TABLE II.—UNSUCCESSFUL CASES.—BRITISH PRACTICE.

No.	Date.	Operator, or Authority.	Patients' Name.	Hours in Labor.	Cause.	Results to Mother.	Results to Child.	References
1	1737	Mr. R. Smith, Edinburgh	Paterson	7 days	... ..	died	dead	Smellic's Mid. vol. iii. p. 423.
2		Professor Young	... ..	...	... ..	died	alive	MSS. Lectures.
3		Ditto	... ..	...	... ..	died	alive	Do.
4	1740	Dr. White, Manchester	... ..	..	... ..	died	dead	Hull's first letter.
5		Mr. Wood, Edinburgh	... ..	..	... ..	died	dead	Do.
6	1769	Mr. Thompson, London	Martha Rhodes	24 hours	... ..	died	alive	Med. Obs. & Enq. vol. iv. p. 261.
7	1774	Dr. Cooper, London	Eliz. Foster	2 days	moll. ossium.	died	alive	Ibid, vol. v. p. 218.
8	1774	Mr. Chalmers, Edinburgh	Eliz. Clarke	12 days	.. ..	died	alive	Hamilton's Outlines, p. 339.
9	1775	Mr. Whyte, Glasgow	... ..	...	... ..	died	dead	Hull.
10	1777	Mr. Atkinson, Leicester	El. Hutchinsonson	3 days.	moll. ossium.	died	alive	Hull, p. 67.
11		Mr. Clarke, Wellingborough	... ..	8 days	... ..	died	dead	Mem. Med. Soc. vol. v.
12	1794	Dr. Hull, Manchester	Isabel Redman	12 hrs.	moll. ossium.	died	saved	First Letter, p. 162.
13	1798	Ditto	Ann Lee	10 days	... ..	died	dead	Do. p. 172.
14	1795	Dr. Hamilton, jun. Edinb.	Jean Douglass	2 days	malacosteon.	died	alive	Outlines.
15	1798	Mr. Kay, Forfar	.. ..	3 days	malacosteon.	died	alive	Hull's letter.
16	1799	Mr. Wood, Manchester	El. Thompson	...	distortion.	died	saved	Mem. Med. Soc. vol. v.
17	1800	Mr. John Bell, Edinburgh	... ..	...	... ..	died	saved	Med. Chir. Trans. vol. iv. p. 347.
18		Mr. Dunlop, Roehdale	Susan Holt	..	. . .	died	alive	Hull's Baudeloeque, p. 134.

TABLE II.—Continued.

No.	Date.	Operator, or Authority.	Patients' Names.	Hours in Labor.	Cause.	Results to Mother.	Results to Child.	References.
19		Mr. Wood	H. Rheubotham	..	... ..	died	dead	Med. and Phys. Jour. vol. vi. p. 346.
20		Dr. Kellie, Leith	... ..	24 hrs.	.. ..	died	dead	Ed. Jour. vol. viii. p. 11.
21		Mr. Kinder Wood	... ..	...	... ..	died	dead	Med. Chir. Trans. vol. vii. p. 264.
22	1817	Barlow and Cort	Ann Hacking	.	... ..	died	alive	Barlow's Essays.
23	1821	Barlow and Dugdale	Mrs. Ridgedale	..	... ..	died	alive	Merriman, p. 317.
24		Dr. Henderson, Perth	Mrs. Lowe	18 hrs.	distortion	died	alive	Ibid.
25	1826	Mr. Crichton	.. ..	6 days.	distortion	died	saved	Ed. Jour. July, 1828, p. 53.
26	1829	Dr. McKibbin, Belfast	.. ..	..	exostosis	died	dead	Ed. Jour. Nov. 1831, p. 352.
27		Mr. Ward	.. ..	..	... ..	died	dead	Lancet, Mar. 28, 1840.
28	1834	Dr. Montgomery, Dublin	.. ..	..	fibrous tumor	died	dead	Dub. Jour. vol. vi. p. 418.
29	1840	Dr. Elliott, Waterford	... ..	..	distortion	died	dead	Letter to the Author.

TABLE II.—SUCCESSFUL CASES.—FOREIGN PRACTICE.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
1	1500	Jacques Nufer	...	...	...	Baulin. Simon.
2-7		N. Guillet, of Milly	...	...	6 saved	Operated upon 6 times. Rousset.
8-10		Le Noir and Lebrun	...	...	3 saved	Operated upon 3 times. Rousset.
11		J. Desmarais	...	...	...	Rousset. Simon.
12		M. Debonaire	...	...	...	Hull.
13			...	...	...	Rousset.
14	1542	M. Vallean	...	...	...	Hull's second letter.
15	1554	P. Migneau	...	...	...	do.
16	1556	M. Lucas	...	...	...	do.
17	1562	A. Venosta	...	...	...	do.
18	1576	M. Aubrey	...	...	...	do.
19	1578	Aubrey and Colas	...	...	...	do.
20	1582	M. Jacotin	...	...	...	do.
21		do.	...	...	...	do.
22		do.	...	...	...	do.
23	1582	M. Lucas	...	...	...	do.
24	1582	M. Robin	...	...	...	do.
25	1621	M. Schutzer	...	...	...	do.
26	1627	P. Hoehstetten	...	...	...	do.
27		L. Petit	...	...	...	do.
28-29	1658	Beyne and Bouvet	...	...	...	Bandelocque, translated by Hull.
30	1667	M. Saviard	...	...	...	Hull.
			...	...	1 saved	Twice operated. Jour. des Scav. 1691.
			...	...	saved	Ibid, 1693.

TABLE III.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
31		...	at Castel Naudry	rec.		Scip. Merc. Simon. Hull.
32		...	Ditto	rec.		do.
33-39		Sonnus	his own wife	rec.		Operated 7 times. Simon. Hull.
40		O. Rudbeck	his own wife	rec.		Simon. Hull.
41-45		a surgeon at Paris	his own wife	rec.		Operated 5 times. Bartholin.
46	1627	...	at Messemy	rec.	saved	Panthot. Hull.
47-49	1637	...	...	rec.		3 times. Hull.
50-55	1637	...	at Auçois	rec.		6 times. Raynaud.
56	1693	M. Lankisch	...	rec.		Acta. Erud. Lips. 1693.
57	1695	C. Vater	...	rec.		Diss. de partu. Cæs. 1695.
58	1704	Ruleau de Xaintes	..	rec.		Traité de l'Oper. 1704.
59		do.	..	rec.	dead	do.
60		A Surgeon at Caudette	Mad. Gourdain	rec.	saved	Simon. Hull.
61		M. L'Amiral	..	rec.	saved	do.
62		do.	...	rec.	saved	do.
63		M. de Thise	in Luxembourg	rec.	saved	do.
64		do.	at Rochefort	rec.	saved	do.
65		do.	at Ave	rec.	do.	do.
66		M. Brou	M. La Roche	rec.	saved	do.
67	1721	M. Prevost	at Puisseaux	rec.		Delaunay.
68	1723	Mad. Flandrin	Mad. François	rec.	dead	Simon. Hull.
69	1726	M. Noyer	M. L'Esperat	rec.	dead	do.
70	1728	M. Brand	J. Boxmeer	rec.		Delaunay.

TABLE III.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation or Reference.
71	1738	M. de Blierre	Mad. de Storheaux	rec.	dead	Simon. Hull.
72	1740	M. Soumain	M. Desmoulins	rec.	saved	Simon. Hull.
73		M. le Coute	at Hambie	rec.	..	Hull.
74	1746	M. Guenin	... ..	rec.	..	} Hist. des deux Oper. &c. 1750.
75	1749	do.	.. ..	rec.	..	
76		M. Thibaut	.. ..	rec.	dead	Hull.
77		M. Cabani	at Givet	rec.	..	do.
78		do.	Ditto	rec.	..	do.
79	1752	M. Buyrette	at St. Menehoud	rec.	..	Baudelocque.
80	1753	M. Beaudeau	... ..	rec.	saved	do.
81		M. Cayne	... ..	rec.	..	do.
82	1760	a Surgeon	at Bossand	rec.	..	do.
83		M. Sanson	at Roinvillie	rec.	..	Hull.
84	1767	M. Vermond	... ..	rec.	2 saved	Baudelocque. Twins.
85	1763	M. des Bois	at Mans	rec.	..	do.
86	1767	M. Lebas	at Mouilleron	rec.	..	do.
87	1769	do.	.. ..	rec.	..	do.
88	1769	a Negro Woman	on herself	rec.	..	Morton.
89		a Surgeon	at Attichi	rec.	..	Baudelocque.
90	1774	M. Millot	... ..	rec.	..	Hull.
91	1775	M. Lambron	M. Dumont	rec.	..	Baudelocque.
92	1779	do.	on the same	rec.	dead	do.
93	1776	M. Dufrechou	at Symore	rec.	alive	do.
				rec.	..	do.

TABLE III.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
94-99	1773 } 1785 }	M. Tenon	Hotel Dieu, Paris	6 rec.		6 operations. Baudelocque.
100	1778	M. Riollès	...	rec.		Baudelocque.
101	1778	M. Deleurie	...	rec.		Lauverjat. Baudelocque.
102	1778	M. Hennequin	...	rec.	dead	Baudelocque.
103	1779	M. Fritse	...	rec.		Hull.
104	1780	M. Warroquier	M. Schulers at Lille	rec.		Baudelocque.
105		do.	...	rec.		do.
106	1782	M. Caque	of Rheims	rec.		do.
107	1782	M. Lauverjat	M. Baufels	rec.		Traite de l'Operat.
108	1782	M. Starke	...	rec.	saved	Brewer. Hull.
109	1785	Dr. Zabdellia	M. Gratien	rec.		do.
110	1786	M. Favereau	at Jallais	rec.		Baudelocque.
111		M. Vinar	his own wife	rec.		Hull.
112	1787	M. Lauverjat	Mad. D———	rec.		Traite de l'Operat.
113	1787	M. Lefranc	at Pommeraie	rec.		Baudelocque.
114	1789	M. Soek	at Leyden	rec.		do.
115	1792	do.	...	rec.		do.
116	1796	M. Dumay	at Fontenai	rec.		do.
117	1796	Rhode and Sommer	N—— N——	rec.		do.
118	1797 }	MM. Burekhardt and Man-	L. Mautz	rec.		Michaelis Abhandlungen, &c. p. 47.
119	1805 }	gold	do.	rec.		
120	1797	M. Bacqua	at Nantes	rec.		Baudelocque.
121		do.	...	rec.		do.

TABLE III.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mothers.	Results to Child.	Observation, or Reference.
122	1798	M. Pournal	...	rec.	dead	Baudelocque.
123		M. Chabrol	Mad. Valandre	rec.	alive	Hull.
124		M. Zimmermann	Mad. du Cheirey	rec.		do.
125		M. Trouard	at Dieppe	rec.		do.
126-32		Count Nessel	..	rec.		Operated 7 times. do.
133		M. Pictsch	..	rec.	saved	do.
134		M. Leber	..	rec.		Mohrenheim. Hull.
135		M. Ronsæus	..	rec.		Hull.
136	1802	M. Lorinzer	Gröger	rec.		Michaelis, p. 52.
137	1805	do.	on same	rec.		do.
138-40	1805-8 -11	M. le Maistre	at Aix	rec.		Operated upon 3 times. Bull. gen. de Ferrussac.
141	1810	M. Chapuis	..	rec.		Ansiaux Clin. Chir. ix. 13.
142		M. Mederer	Brigau	rec.		Baudelocque.
143		do.	...	rec.		do.
144		do.	...	rec.		do.
145		M. Schnucker	...	rec.		Baudelocque. Brewer.
146		M. Perrard	...	rec.		do.
147	1813	M. Velten	..	rec.		Michaelis, p. 115.
148	1813	M. Walther	..	rec.		Bull. de Ferrussac xviii. 404.
149	1814	M. Dariste	at Martinique	rec.		Hull.
150		do.	on the same	rec.		do.
151		M. Balk	..	rec.		Ryan's Midwifery.
152	1817	M. Meyer	of Minden	rec.	dead	Med. Chir. Trans ix. 11.

TABLE III.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
153	1817	Dr. Locher	of Zurich	rec.	saved	Med. Chir. Trans. ix. 13.
154	1817	M. Cecconi	of Parma	rec.	saved	Michaelis, p. 115.
155	1819	M. Spitzbarth	Muller	rec.	saved	do. 116.
156	1820	M. van Buren	at Tortola	rec.		Journ. Univ. xxxi. 369.
157		M. Lantez	...	...		Bull. Gen. de Ferussac, xii. 70.
158		M. Handry	...	...		Jour. Gen. de Med. ix. 389.
159		M. Gardey	on same patient	rec.		Journ. Univ. li. 66.
160		do.		rec.		do.
161		M. Mergaut	..	rec.		Ditto xiv. 106, Velpeau.
162		M. Seruin	..	rec.		} Lagardère Thèse.
163		M. Alazar	..	rec.		
164		M. Vagarous	..	rec.		
165-66		M. Lordat	twice on same	rec.		Thèse, 1817.
167	1821	M. Alliprandi	of Saluzzo	rec.	dead	do.
168	1821	M. Horn	— Amos	rec.		do. 117.
169		M. Jolly	Chateau Thierry	rec.	saved	} Amer. Med. Jour. Nov. 1831.
170		do.	..	rec.	saved	
171		do.	..	rec.	saved	
172		do.	...	rec.	saved	
173	1821	M. Zentel	Wester	rec.	saved	Michaelis, p. 71.
174		M. Loreille	...	rec.		Bull. de la Faculté, 1816, p. 45.
175	1821	M. Merrem	on same person	rec.	saved	Michaelis, p. 56.
176	1826	do.		rec.	saved	do.
177	1822	M. Müller	at Wiesenthal	rec.	saved	Michaelis, p. 119.

TABLE III.—*Continued.*

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
178	1823	M. Collin	..	rec.	saved	Bull de la Faculté, 1816, p. 45.
179	1825	M. Schenck	F. Henzel	rec.	saved	Michaelis, p. 71.
180	1825	do.	do.	rec.	saved	do. 121.
181	1823	M. Leuch	J. Hügli	rec.	rec.	do. 120.
182	1823	M. Echelburg	E. Kempten	rec.	saved	Ed. Jour. vol. xxvi. p. 296.
183	1823	M. Bosch	..	rec.	rec.	Anstaux.
184	1823	do.	on same person	rec.	rec.	do.
185	1824	M. Engeltrum	P'arenhorst	rec.	saved	Michaelis, p. 68.
186	1825	M. Müller	of Löwersburg	rec.	saved	Amer. Journ. vol. v. p. 530.
187	1825	..	Prague Hosp.	rec.	rec.	Michaelis, p. 99.
188	1825	M. Vanderfuhr	..	rec.	saved	Revue Med. vol. iv. p. 132.
189	1825	M. Græfe	..	rec.	saved	Bull. gen. de Ferrussac, xii. 369.
190	1826	Dr. Schmidt	..	rec.	dead	Siebold's Jour. vol. viii. p. 259.
191	1827	M. Jaeggy	..	rec.	rec.	Siebold's Journal, vol. ix. p. 693.
192	1827	M. Johanknecht	F. Schwaller	rec.	dead	Michaelis, p. 125.
193	1827	M. Andreini	..	rec.	rec.	Revue Med. vol. i. p. 119. 1828.
194	1827	M. Neuber	of Florence	rec.	dead	Michaelis, p. 122.
195	1827	M. Metz	J. Bornholdt	rec.	saved	do. 124.
196	1827	M. Tassinari	..	rec.	rec.	Lancet, Nov. 22, 1828, p. 253.
197	1827	M. Lauz	..	rec.	rec.	Michaelis, p. 127.
198	1828	M. Hocbake	W. Hummerich	rec.	rec.	Bull. Med. Belge, Feb. 1838.
199	1831	M. Metz	— Bosman	rec.	rec.	Michaelis, p. 128.
200	1834	M. Hocbake	..	rec.	rec.	Bull. Med. Belge, Feb. 1838.
201	1836	M. Duchateau	— Anhart	rec.	rec.	La Presse Med. No. 7, 1837.
			..	rec.	rec.	

TABLE III.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
202	1836	Dr. Stracke	Johanne S—	rec.	saved	{ N. Zeitschrift für Geburtskunde, vol. 8, p. 161. Bull. Med. Belgc. Feb. 1838. do. do. twins. do. died of fever afterwards.
203	1837	M. Hoeboke	— de Wolf	rec.	dead	
204	1837	do.	— Tortelbrom	rec.	saved	
205	1837	do.	— V—	rec.	dead	
206	1838	do.	— de Coste	rec.	saved	Michaelis Abhandlungen. Lancet, March 28, 1840. Bull. Med. Belge, Jan. 1839. Journ. des Connois. Jan. 1839. Lancet, Mar. 28, 1840. Ibid. Caspar's Wochenschrift. Med. Chir. Rev. Oct. 1840, p. 323. British and Foreign Review. Oct. 1840, p. 572. Gaz. Med. July 11, 1840.
207	1826	M. Zwanck	on same woman	rec.	saved	
208	1830	M. Weidman	— Adawetz	rec.	saved	
209	1832	M. Michaelis	...	rec.	saved	
210	1836	do.	J. Lorthiot	rec.	saved	
211		Evrard and Laforce	..	rec.	saved	
212		M. Lestiboudois	..	rec.	saved	
213		M. Bauer	...	rec.	saved	
214		Dr. Petrenz	..	rec.	saved	
215		Dr. Wiefel	..	rec.	saved	
216			..	rec.	saved	
217	1840	Dr. Godefroi	..	rec.	saved	

TABLE IV.—UNSUCCESSFUL CASES.—FOREIGN PRACTICE.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
1		M. Guillemeau	..	died		Guillemeau.
2		do.	..	died		do.
3		M. Viart	..	died		do.
4		M. Brinet	..	died		do.
5		M. Charbonnet	..	died		do.
6		...	..	died		} Al. Maseriæ Prax. Med. 1601. Hull.
7		...	..	died		
8		...	..	died		
9	1741	...	at Biectre	died		
10	1751	M. Paret	at St. Etienne	died		Weidmann.
11	1753	M. Isabeau	at Gien	died		do.
12	1754	MM. Ledoc and Guathier	at Vernueil	died	saved	Tenon.
13	1758	M. Sehuzer	a dwarf	died	saved	Baudeloque.
14	1758	M. Ravenet	at Paris	died	saved	Weidmann.
15	1763	M. Lambert	at Castanet	died		Baudeloque.
16	1764	M. Pietsch	..	died		Tenon.
17	1767	M. Vermond	..	died	saved	Baudeloque.
18	1770	M. d'Angerville	..	died	saved	do.
19	1772	M. Vimar	..	died	dead	do.
20		MM. Cleriau and Barbaut	..	died	dead	do.
21		M. Henckel	..	died		Med. und Chir. Anmerk.
22	1772	M. Larrouture	..	died		} Journ. de Med. vol. 68.
23		do.	..	died		

TABLE IV.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
24	1773	M. Lauerjat	M. Monginot	died	saved	Traité de l'oper. &c.
25	1781	do.	L. E. Debie	died	saved	do.
26		do.	...	died	dead	Baudelocque.
27	1776	M. Warroquier	...	died	saved	do.
28		do.	...	died		do.
29	1777	M. Sommer	...	died		do.
30	1778	M. Bonnard	of Hesdin	died	saved	Journal de Med. 1778. Hull.
31	1778	M. Moreau and Ferrand	at Hotel Dieu, Paris	died		Baudelocque.
32	1779	do.	do.	died	saved	do.
33	1778	M. Camper, pupil of Solayres	in Holland	died		do.
34	1778	Prof. Siebold	Cath. Koch	died	alive	Baudelocque. Hull,
35	1779	M. Juppin	near Rethel	died		do.
36	1779	M. Delcurie	...	died	saved	Diss. sur l'Oper. Cas. &c.
37	1780	M. — S —	...	died	saved	Baudelocque.
38		do.	...	died		do.
39		G. W. Stein	...	died		Hull.
40		do.	...	died		do.
41		do.	...	died	saved	do.
42	1781	M. Desgranges	at Lyons	died	living	Baudelocque.
43	1781	...	at Angers	died	dead	do.
44	1782	M. Terne	at Stompwyck	died	dead	Hull.
45	1785	...	at Bayonne	died		Baudelocque.
46	1785	M. Baudelocque	A. Fomard	died	saved	do. p. 82.
47	1786	do		died	saved	do.

TABLE IV.—*Continued.*

No.	Date.	Operator, or Reporter	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
48		a Surgeon	at —	died	dead	Baudeloeque.
49		M. Gilbert	at Lectours	died	dead	do.
50	1787	M. Danvers	at Corbeille	died		do.
51	1787	M. F. Haas	Lney Franzin	died		Hull.
52	1788	M. Dubois	— Vasseur	died		Baudeloeque.
53		do.	..	died		do.
54		do.	..	died		do.
55		do.	...	died		do.
56	1795	M. Desault	...	died	dead	do.
57		M. Pelletan	...	died	saved	do.
58		do.	...	died	saved	do.
59	1797	M. Coutouly	Desnos	died	saved	do.
60	1797	...	at Lyons	died		do.
61		M. Tarbès	...	died	dead	do.
62	1797 to		...	died	saved	Memorial.
63	1809	Mad. Boivin	...	died		
64		do.	...	died	dead	do.
65		Mad. Lachapelle	...	died	dead	La Pratique, &c.
66	1798	M. Plessmann	...	died	saved	Baudeloeque.
67		M. —	at Epinal	died	saved	do.
68	1802	M. Mursina	K. Fleury	died	saved	Michaelis, p. 81.
69		M. Ramboux	of Liege	died		Velpeau, p. 48.
70	1804	M. Weidmann	Fr. Porlitz	died	saved	Michaelis, p. 82.
71	1805	MM. Naegle and Walker	Fr. Dienstuhler	died	dead	Erfahrungen und Abhandl. p. 409.

TABLE IV.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
72		M. Ohle	...	died	dead	Michaelis, p. 82.
73	1805	M. Sarvaos	...	died	dead	do.
74	1805	M. Weise	...	died	do.	p. 84.
75	1805	M. Osiander	...	died	dead	do. p. 83.
76	1806	do.	...	died	do.	p. 84.
77	1806	M. Michaelis	...	died	saved	do. p. 85.
78	1806	M. Ficker	...	died	do.	do.
79		M. Wendelstadt	..	died	do.	do.
80		do.	...	died	do.	do.
81	1808	Hasner and Mendel	Fr. Gunther	died	saved	do. p. 86.
82	1808	M. Froriep	...	died	saved	do.
83	1809	M. Sander	of Nordhausen	died	saved	do.
84		...	at Bamberg	died	do.	do.
85-87	1810	M. Assalini	Hosp. at Milan	3 died	1 saved	3 cases, Merriman.
88	1811	M. Wayland	Fr. Scheckeman	died	saved	do. p. 87.
89	1811	Ramoux and Ansiaux	..	died	dead	do.
90	1811	M. Siebold	M. R.	died	saved	do.
91	1813	M. Leydig	...	died	dead	do. p. 88.
92		M. de Haber	...	died	dead	Journ. Compl. vol. iv. p. 248.
93		M. Riecke,*	...	died	do.	Arch. Gen. vol. xxii. p. 371.
94	1814	M. Sehlegel	..	died	saved	Bull. de Ferussac, vol. i. p. 353.

* I have taken the following nine cases from Velpeau, who neither gives dates, nor the result to the child

TABLE IV.—Continued.

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
95		M. Gensoul	...	died		Jour. Clin. de Lyon, vol. i. p. 300.
96		M. Bello	...	died		Trans. Med. vol. xiii. p. 285.
97		M. Mazzoni	...	died		Statistica Ostr. p. 47.
98		...	...	died		Revue Med. 1830, vol. iii. p. 91.
99		...	...	died		Journ. Compl. vol. xli. p. 210.
100		...	...	died		Lancette Fran. vol. iv. p. 292.
101	1816	M. Meyerhausen	...	died	saved	Michaelis, p. 90.
102		M. Jolly	at Chateau Thierry	died	dead	American Medical Journal, November, 1831.
103		do.	...	died	dead	2d operation. Med. Chir. Trans.
104	1819	Dr. Locher	of Zurich	died	dead	Sprenkel.
105	1820	Dr. Omboni, Pavia	...	died	dead	Michaelis, p. 90.
106	1820	M. Oesterlen	F. Mockestin	died	saved	do. p. 91.
107	1820	M. Stein	...	died	saved	do.
108	1821	M. Berger	F. Stilling	died	saved	do.
109	1821	M. Kempel	...	died	do.	do.
110	1821	M. Ritgen	...	died	do.	do.
111	1821	M. d'Outrepont	...	died	do.	p. 92.
112		M. Dybeck	...	died	saved	do.
113	1822	M. Lovati	...	died	saved	do. p. 93.
114	1822	Dr. Rast	...	died	do.	p. 97.
115	1822	M. Busch	of Zeitz	died	saved	Siebold's Journ. vol. viii. p. 33.
116	1823	M. Dicke	...	died	saved	Geburtshülfe Abhandl. p. 168.
117	1823	M. Seidler	Fr. Martin	died	saved	Michaelis, p. 93.
			...	died	do.	p. 94.

TABLE IV.—Continued.

No	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
118	1823	M. Armbruster		died	saved	Michaelis, p. 95.
119		M. Van Buren	of Tortola	died	saved	do.
120	1823	M. Henne	of Königsberg	died	saved	do. p. 96.
121	1823	M. Lovati	..	died	saved	do. p. 97.
122	1824	do.	..	died	dead	do.
123	1827	do.	..	died	saved	do. 102.
124	1824	Dr. Meyer	at Minden	died	saved	Ed. Journ. vol. xxii. p. 248.
125	1824	M. Beauchaire	..	died	dead	Michaelis, p. 98.
126	1825	Dr. Schmit	of Eylau	died	saved	2d operation. Michaelis, p. 66.
127	1825	M. Mende	..	died	dead	Michaelis, p. 98.
128	1825	..	Prague Hosp.	died	saved	do. p. 99.
129	1825	..	do.	died	saved	do.
130	1825	..	at Prague	died	dead	do.
131	1825	M. Wolfe	..	died	saved	do.
132	1826	Dr. Engeltrum	— Farenhorst	died	saved	2d operation. do. p. 68.
133	1826	M. Merren	S— Keru	died	dead	do.
134	1826	M. Carus	of Dresden	died	do.	do. p. 100.
135	1827	M. Klugè	..	died	saved	do. p. 100.
136	1827	M. Ritgen	..	died	saved	do. p. 101.
137	1827	M. Busch	..	died	saved	Geburtshülliche Abhandl. p. 168.
138	1828	Mr. Johanknecht	..	died	saved	Michaelis, p. 103.
139	1828	M. Catolica	..	died	saved	Lancet, 1829, p. 192.

TABLE IV.—*Continued.*

No.	Date.	Operator, or Reporter.	Patient, or Place.	Results to Mother.	Results to Child.	Observation, or Reference.
140	1828	M. Ferrario	...	died	saved	Michaelis, p. 102.
141	1829	M. Kilian	..	died	saved	do. p. 103.
142	1830	Dr. Neuber	...	died	saved	do.
143	1832	Dr. Stein	...	died	saved	Siebold's Journal, vol. xiii. p. 217.
144	1832	M. Hoeboke	— Anhart	died	saved	Bull Med. Belge, Feb. 1838.
145	1837	do.	— de Pede	died	dead	do.
146	1837	do.	— Bosleuw	died	alive	do.
147	1835	Dr. Bauer	...	died	saved	Siebold's Journal, vol. xvi. p. 257.
148	1837	M. Buseh	...	died	dead	Med. Gaz. March 30, 1840.
149		Dr. Hamm	...	died	saved	Lancet, March 28, 1840.
150	1839	M. Dubois	R. Rejnier	died		Lancet, June 1, 1839.
151	1840	do.	...	died	saved	Lancet, Feb. 22, 1840.
152		Dr. Herzbruch	...	died	saved	Lancet, March 28, 1840.

These tables yield the following results :

1. Among British Practitioners, in 40 cases, 11 mothers recovered, and 29 died, or nearly three-fourths.

2. Out of 37 cases where the result to the child is mentioned, 22 were saved, and 15 were lost—or 1 in $2\frac{1}{2}$.

3. Among Continental Practitioners, out of 369 cases, 217 mothers recovered, and 152 died—or about 1 in $2\frac{1}{2}$.

4. Out of 187 cases where the result to the child is given, 138 were saved, and 49 were lost—or nearly 1 in 4.

5. Taking the entire number, which amounts to 409, we find that 228 mothers were saved,* and 181 lost—or about 1 in $2\frac{1}{2}$; and that out of 224 children, 160 were saved, and 64 lost—or about 1 in $3\frac{1}{2}$.

The reader will probably be as much surprised as I was myself at the number of operations here recorded. They exceed any hitherto collected, except those published by M. Figueira (*i. e.*, 790 cases, of which 424 were fatal.) To guard against mistake, I have carefully quoted my authorities, and where these are but secondary, I have consulted the originals, as far as I could obtain access to them.

As to the value of each case, that must depend upon the reporter. I have not felt it my duty to exclude any which is related upon definite authority—my endeavour throughout has been to ascertain that authority as far as possible, and to avoid repetitions. For so much I am responsible, and I trust I shall be found correct.

It may, however, be objected to this catalogue of operations,

* I do not mean that so many mothers were saved from death by the operation, but that they were saved from the effects of the operation. No doubt, many were really saved from death, which could not have been otherwise avoided; but we have proof that many could have been delivered by other means, inasmuch as they afterwards bore children naturally.

that many of the cases occurred in the “dark ages” of midwifery, and may, perhaps, have been exaggerated, or invented. I do not know that we can fairly deny their authenticity ; but suppose that we admit this, and only take those which have occurred since 1750, the result will still be more favourable than we should have anticipated—for this calculation gives 316 operations, from which 149 mothers recovered, and by which 129 children were saved, and 53 lost, in 182 cases where the result is mentioned.

Further : on a good number of these patients, the operation has been performed more than once ; on some three and four times. And if we credit the older writers, (and I do not know why we should not,) we find five, six, and seven times with success.

This is shewn in the following table :

TABLE V.—REPEATED OPERATIONS UPON THE SAME PERSON.

No.	Date.	Operator, or Authority.	Patient, or Place.	Number of Operations.	No. of Children saved.	Result to Mothers.
1		— Guillet	...	6 times	6	saved.
2		Le Noir and Lebrun	...	3 times	3	recovered.
3		M. Jobert	...	twice	1	rec.
4		M. Peyronnie	...	twice		rec.
5		M. Somnius	his own wife	7 times		rec.
6		a Surgeon at Paris	his own wife	5 times		rec.
7		...		3 times		rec.
8		...	at Augois	6 times		rec.
9		Count Nesson	..	7 times		rec.
10	1775-9	M. Lambron	..	twice		rec.
11	1797					
12	1801	Mangold and Bureckardt	L. Mautz	3 times		recovered twice—died after third.
13	1805					
14		M. Bacqua.	— Gabery	twice		rec.
15	1796					
16	1810	Rhode and Sommer	...	twice		rec.
17	1802					
18	1805	Lorinzer	— Gröger	twice		rec.
19	1805					
	7-11	M. le Maistre, d'Aix	— Fauve	3 times		rec.
20	1817					
	1819	M. Locher	..	twice		rec. once—died second time.

TABLE V.—*Continued.*

No.	Date.	Operator, or Authority.	Patient, or Place.	Number of Operations.	No. of Children saved	Result to Mothers.
21	1821 } 1826 }	M. Merrem	— Viandes	twice		rec.
22	1823	M. Bosch	... ..	twice		rec.
23	1823 } 1825 }	M. Schenek	... ..	twice		rec.
24		M. Dariste	Martinique	twice		rec.
25	1826, } 30, 32 } 39 }	M. Michaelis	— Adawetz	4 times		rec.
26		M. Gardey	... ..	twice		rec.
27	1825 } 1826 }	Dr. Schmidt	... ..	twice		rec. once—died second time.
28	1824 } 1826 }	Dr. Engeltrum	Amsterdam	twice	2 saved	rec. once—died second time.

* "Le rapport des opérations pratiquées avec succès une seconde fois est très favorable, c'est adire—11; 5. tandis que le rapport général des opérations heureuses aux malheureuses est inverse 3; 4. — *Velpeau, Traité des Accouch.* p. 458.

After a careful examination of the cases on record, I think we may fairly conclude, that as so many women have recovered from the operation, *it does afford a chance to both mother and child, and that therefore we may be justified in having recourse to it ; but that, as the danger is much greater than from any other operation, we should not be warranted in performing it, if there were a prospect of success by other means.*

This, then, constitutes the sole *advantage* of the operation, that in *cases where we cannot deliver the patient by any other means, and when, consequently, both mother and child would inevitably die if left unaided, we may afford each a chance, by performing the Cæsarian section.*

It has no *comparative* advantages, being itself the ultimate standard by which the other operations are to be estimated, and which are valuable, inasmuch as they afford a means of escape from this more formidable one. In this point of view I must not omit noticing one, which, although not available in any case to which we are called at the time of labor, may prevent the necessity of a second operation.* I allude to the artificial induction of premature labor, or of abortion. Whenever the diameters of the pelvis are so reduced as to render the extraction of a mutilated fœtus impossible, or even hazardous, I conceive that it would be grievous neglect of duty (if we have a voice in the matter) not to propose this

* "To preclude the possibility, therefore, of a second need for the incisions, before closing the abdomen, the operator, I conceive, ought to remove a portion, say one line of the Fallopian tube, right and left, so as to intercept its calibre, the larger blood-vessels being avoided. Mere division of the tube might be sufficient to produce sterility, but the further removal of a portion of the canal appears to be the safer practice. I recommend this precaution, therefore, as an improvement of the operation."—*Blundell's Obstetricy*, p. 567.

alternative. It is true that by this operation the child will be lost, but the mother will in all probability be saved ; and the bare chance of saving the child by Cæsarian section, can never compensate for the additional risk to the mother.

The *disadvantages* of the operation will be easily gathered from what has been said ; they are mainly, the great risk of hemorrhage or fatal peritonitis to the mother, and the small chance afforded to the child ; and these constitute the *objections* to the operation.

That these are very serious objections cannot be denied, nor that they would be insurmountable, had we any other mode of delivery. But when we consider that the only choice is between this operation, which does afford some chance, and certain death to both mother and child, we cannot, I think, hesitate about running the risk.

Doubtless, however, the dangers of the operation should make us pause, and carefully examine the facts of the case, with the aid of the experience of others, before we decide upon this proceeding. In the present day it would be a deep disgrace to an accoucheur, that his patient, after recovering from the Cæsarian operation, should bear children without assistance.

The *cases suitable for the operation* are not very numerous.

1. When the pelvis is so distorted from any cause, that the diameter of the upper or lower outlet is reduced to an inch and a half, or two inches, it may be considered impossible to extract a mutilated fœtus ; or, if possible, it must be with so much force as to entail the death of the mother. (*Burton*,* *Hamilton*,† *Hull*.‡)

* Midwifery, p. 262.

† Midwifery, p. 320.

‡ First and Second Letters to Simmons.

The operation is equally necessary under these circumstances, whether the child be alive or dead, and it may also be required (in consequence of mollities ossium) after several children have been born naturally.*

2. Morbid growths from the periosteum, which offer a fixed and permanent obstacle, may so much reduce the calibre of the passage as to render this operation necessary. This was the case with the patient of my friend Dr. Montgomery.

But before we decide upon the necessity for this mode of delivery, we must be quite sure that the obstacle can neither be displaced nor reduced in volume; and this can seldom be determined until labor commences. My friend Dr. Thos. Beatty communicated the particulars of a case to the Obstetrical Society, which illustrates this remark. The pelvis was occupied by a tumor which was nearly immoveable, and it was *feared* that the Cæsarian Section might be necessary. However, in the progress of the labor the tumor was displaced, and the child was born (breech presentation) without the interference of art.

3. In some cases of ruptured uterus, when delivery is imperative, but impossible "*per vias naturales*," Cæsarian Section is recommended. It appears to me that the additional risk from the operation renders its propriety very questionable.†

4. The operation has been performed successfully in cases of extra-uterine fœtation, where the continued presence of the fœtus in the abdominal cavity threatened the mother's life.‡ (*Jacob*, § *Hull*.||)

* Cooper, Med. Obs. and Enquiries, vol. v.

† Hull's Second Letter, p. 214.

‡ Mem. of the Med. Society, vol. iii. p. 176.

§ Ecole Pratique, p. 394.

|| Second Letter, p. 223.

5. In case of the sudden death of the mother, Cæsarian Section may be performed for the purpose of saving the infant. Many successful cases are on record.

6. If towards the end of pregnancy the uterus be wounded extensively, Dr. Hull conceives the Cæsarian Section necessary.

Of course the operation will be useless unless the woman have arrived at that period of pregnancy when the child is "viable."

It will also be in vain if much time have elapsed after the death of the mother. Dr. Jackson, however, recovered an infant half an hour after the death of the mother.

7. Authors have mentioned other cases to which the operation was applicable, as in occlusion of the vagina, scirrhus uteri, &c.

But these do not appear to me adequate grounds for so serious an operation.

The best *period for the performance* of the operation appears to be at the commencement of labor, provided there be no doubt of its necessity. The strength of the woman is then unimpaired, and she can not only support the operation better, but has greater prospect of escaping subsequent inflammation.

It is supposed, and I think not without foundation, that the ill success which has attended the operation in this country, is owing to the late period at which it has been undertaken.

In Mr. Thomson's case, it was performed 24 hours after the commencement of labor; in Dr. Cooper's, 12 hours; in Mr. Chambers' case the labor had lasted 12 days; in Dr. Hamilton's, more than 2 days; in Mr. King's, more than 3 days; in Mr. Atkinson's, nearly 3 days; in one of Dr. Hull's, (Isabel Redman,) 12 hours; in the other, (Ann Lee,)

10 days ; in the case of Mary Donally, 12 days ; in Mr. Barlow's case, 5 days.

Dr. Hull proposes to operate as soon as the os uteri is dilated, and before the membranes burst.*

De Graafe advises the operation to be performed just after the rupture of the membranes, and the commencement of the expulsive pains.

Method of operating.—Having determined upon the necessity, and the proper period for the operation, the next subject for consideration is the best mode of performing it. Very little alteration has taken place in this respect since the earlier writers.†

* “ It is therefore advisable, if the liquor amnii be not discharged, and the os uteri can be reached, to defer the operation till this be dilated to the extent of about an inch and a half in diameter. And when this dilatation has taken place, I am of opinion that the operation ought to be immediately performed, lest the membranes should burst.” “ But if the liquor amnii should be discharged at the beginning of the labor, and the os uteri should dilate slowly, or if no part of the uterus be within our reach, I am of opinion that the operation should be performed as soon as possible after the necessity has first been established by a consultation.”—*Hull's 2nd Letter*, p. 295-6.

† It may be worth while extracting Burton's description of the mode of operating, for the purpose of showing how little has been changed since his time: “ Everything being ready, and the patient being held by four persons strong enough, the operator must make a longitudinal incision on the outside of the rectus musele, between the navel and the os ilium ; the skin and membrana adiposa are to be divided for the space of about 8 or 10 fingers breadth, passing afterwards through the oblique and transverse muscles, and then carefully through the peritoneum, in which a small puncture must first be made, and further divided by an incision-knife that has an obtuse point, or a pair of scissors, till the opening appears large enough to extract the fœtus ; this done, the operator must search where the child is lodged ; and if it be lodged without-side of the uterus, in the cavity of the abdomen, it should be immediately extracted, together with its after-birth ; but if it be contained in the fallopian tube, or in the ovary, these parts are to be opened, and the fœtus, with its placenta, removed ; but if it be within the

The bowels and bladder are to be evacuated, and the patient placed on her back, upon a table covered by a mattress. Her fortitude must decide upon the necessity for restraint, and its amount.

Before commencing the operation it will be proper to ascertain (by the stethoscope) the situation of the placenta, or at least that it is not in front.*

The incision through the integuments must then be made, either vertically, through the linea alba—obliquely, on the outside of the rectus muscle—between that muscle and the spine—or horizontally, beneath the umbilicus.† The latter

uterus, that must be opened, by making a longitudinal incision, sufficient to give a passage to the child and its appendages, and after they are removed, the extravasated blood is to be taken away by sponges made warm in water, and the uterus will soon contract itself, and the wounded parts will unite again. The wound in the abdomen is to be joined together by two or three sutures, as is usual in the like cases in such wounds."—*New System of Midwifery*, p. 273.

* The importance of this point is obvious on account of the risk of hemorrhage subsequently, though this does not always take place. Dr. Meyer, of Minden, cut through the placenta, and there was no unusual hemorrhage. Dr. Hull did the same. Baudelocque and John Bell, however, lost their patients by this accident.

† As an illustration, I extract Dr. Hull's account of the operation performed upon Isabel Redman in 1794: "As the uterus occupied the middle part of the abdomen, with only a slight inclination to the right side, I made an incision through the integuments, tendons of the abdominal muscles, and peritoneum, in the course of the linea alba, from about four inches above the umbilicus to nearly two inches below that part, and only so much to the side of the umbilicus as was necessary to avoid wounding it. The uterus was placed in immediate contact with the parietes of the abdomen, at the upper part of the incision; but toward the lower angle of the wound the intestines intervened, and began to protrude as soon as the incision was completed. I then cautiously divided the uterus, and finding the placenta attached to the part I had divided, I cut through a portion of it, and enlarged the wound by a probe-pointed bistoury, directed by my finger introduced at the wound, to the size of the external incision. The upper angle of the wound in the uterus extended nearly to the fundus. The left nates of the child presenting at the wound, by laying hold of the thigh I extracted it very

is the best, if the patient be deformed.* It should be about eight or ten inches in length, and when vertical, it may be commenced a little above the umbilicus, and terminate near the pubes.

This incision may divide the parietes of the abdomen down to the peritoneum, which is then to be cautiously punctured, and a director, or the finger, inserted into the wound, so as to avoid injuring the intestines, and the peritoneum divided.

The uterus will now be exposed, and an incision must be made into, but not through its parietes, of the same length as that through the abdominal parietes. This incision must be cautiously deepened, until the membranes are exposed. A slight opening must then be made in them, and some of the liquor amnii removed, by small pieces of

expeditiously, and with great ease. The child was a fine healthy boy, and cried violently the moment it was brought into the world. The placenta was removed without any difficulty. The intestines, now beginning to protrude through the wound, the position of the patient's head was lowered, and Mr. Fisher having returned the prolapsed portion of the intestines, with a good deal of difficulty retained them within the cavity of the abdomen, by introducing his hand at the wound, and spreading his fingers over them, till I began to stitch up the wound by the interrupted suture. The parietes of the abdomen being extremely thin, the ligatures were placed very near each other, and I carefully avoided passing the needle through the peritoneum. The ligatures were supported by straps of adhesive plaster and a little lint, and a pledget of tow being laid over the plaster, a many-tailed flannel bandage was applied lightly round the abdomen, and secured above by a scapulary, and below by a slip of a roller passed under each thigh."—*Hull's First Letter to Mr. Simmons*, p. 178.

* "The external incision in hysterotomy has been made in various directions. It has in a few instances been made in the form of a crescent, a circle, or a cross, but has generally been made longitudinally, obliquely, or transversely." "Of the cases related by Baudelocque, thirty-five appear to have been made on the side of the abdomen, and eighteen of these with success; thirty in the course of the linea alba, ten successfully; and eight in the manner recommended by Lauerjät, (i.e. transversely,) three of which succeeded."—*Hull's 2nd Letter*, pp. 297, 310.

sponge. It has occurred to me that this might most readily be effected by a syringe. The object in view is to prevent effusion into the abdominal cavity. By Lauverjat and others we are recommended to rupture the membranes previously. The opening is then to be enlarged, and the infant withdrawn, the funis tied, and the placenta and membranes removed.

The remaining liquor amnii, with any blood which may have escaped, must be removed from the cavity of the uterus, and the operator should make sure that the os uteri is pervious, for the escape of the lochia.

No sutures are required in the uterus ; as it contracts, the wound will be reduced to about $1\frac{1}{2}$ or 2 inches in length, and the lips will come into apposition, if it be healthy. It is only in cases where they do not do so, that there is any thing to fear from hemorrhage. When the uterus is diseased, the wound does not close perfectly, and of course, union cannot take place.

The abdominal cavity is next to be lightly sponged, to remove any blood which may have escaped, and then, the intestines being retained "*in situ*" by an assistant, the lips of the external wound are to be closed by as many sutures as may be necessary.

Dr. Monro, of Edinburgh, advised "that in performing the Cæsarion operation, we should be careful that the viscera be exposed as little as possible ; and that the sides of the wound should be kept contiguous by a greater number of stitches than are commonly employed in wounds, in order to exclude the air from the cavity of the abdomen."*

In addition to the sutures, straps of adhesive plaster may be applied, and over all I would suggest Dr. Macartney's water dressing.

* Hamilton's Midwifery, p. 346.

The patient must then be placed in bed, and the utmost quiet observed. Cordials will probably be necessary during and after the operation; and when the patient is settled in bed, an opiate may be given.

As a variation from this mode of operating, I may mention Dr. Aitken's suggestion of performing it "while the parts are immersed in tepid water, so as to seclude the air," and so, perhaps, diminish its fatal effects.* I do not know that this plan has ever been tried.

The *difficulties* of the operation are not great. With a little care, we may avoid that part of the uterus to which the placenta is attached, and which is the most vascular, as the stethoscope, previously applied, will indicate whether it is situated anteriorly or not. Caution will also avoid wounding the child when dividing the uterus.

In approximating the lips of the external wound, the intestines are sometimes troublesome, and it is of importance not to include any, as that would add the dangers of strangulated hernia to the unavoidable risk of the operation.

The principal *dangers* of the operation† are—

* Midwifery, p. 82.

† "Though almost all the patients on whom this operation has been performed died, their death happened at different periods; but not one died either while the operation was performing, or immediately after it. No convulsions were brought on by incisions, nor does it appear that any of them sank through loss of blood, accompanying or succeeding the operation. Some died within twelve, others at the end of twenty-four hours, and a few died on the third day after the operation. If we may judge of the cause of the patient's death by the time of her dying, it might be said that the death of those who failed within twenty-four hours, was probably owing not to the operation alone, but to the violence of this combined with that of the previous disease; but when they survived twenty-four or forty-eight hours, then their death might be attributed to the succeeding inflammation in a body predisposed to disease."—*Denman's Introduction*, p. 333.

1. Hemorrhage, from the incomplete closure of the wound in the uterus.

2. Strangulation of a loop of the intestines, either in the wound of the uterus, or in the external wound ; although due attention will avoid this danger altogether.

3. Subsequent inflammation of the uterus and peritoneum.

The patient may die of the shock within a few hours, or her strength may be exhausted by hemorrhage into the abdominal cavity ; but if she survive for a day or two, her death will then probably be owing to inflammation.

Subsequent Treatment.—The most incessant care and attention will be required. The water-dressing should be continued, and it may be as well to administer small doses of calomel and opium.

On the first appearance of inflammation at the edges of the wound, leeches should be applied along it, and if there be tenderness, a considerable number should be applied over the abdomen, and repeated if necessary, and the doses of calomel and opium increased.

ESSAY VII.

ON SYMPHYSEOTOMY.

SECTION OF THE SYMPHYSIS PUBIS. PELVITOMY. THE
SIGAULTIAN OPERATION.

Section de la Symphyse du Pubis. Symphyseotomie. Operation Sigaultienne. Fr. *Der Schaambeintrennung. Die Schossbeinfugenschnitt. Die Schaamfugenschnitt.* G.

BUT one more operation remains for consideration, and I should have omitted it altogether, had I not felt it as much a duty to point out its inapplicability, as the suitability of the others to the cases for which they were intended. I do not for a moment wish to undervalue the humanity which desired to substitute a minor operation for one so formidable as the Cæsarian Section. But when the results of experience support the opinion of the wisest and best midwifery authors, it would be criminal neglect, did I not adduce the objections to this operation, in their strongest form.

First, however, it may be interesting to give a sketch of its history.

M. Sigault, while yet a student, being impressed with the

fatal results of the Cæsarian Section, conceived that it might be altogether avoided by an artificial separation of the ossa pubis. This notion was based upon the assumed fact, that this joint spontaneously separates in difficult labors. This had been asserted over and over again, by the older writers, and upon this assumption Sigault based his experiments upon the dead body.

In the year 1768, he presented a memoir to the Faculté de Medicine on the subject, proposing that the operation should be tried at first upon animals, and then upon condemned criminals. The memoir was referred to M. Ruffel, who reported unfavorably, and the subject was dropped.

However, M. Sigault was not discouraged; he again proposed it in his Theses, on taking his degree at Angers, and in Paris, on seeking for his license; and as the proposal was communicated to others, and favorably received, it excited a good deal of interest.

In M. Alphonse Le Roi, Sigault met with an able second, and they determined to give the operation a fair trial the first opportunity. This occurred on the 1st of October, 1777, in the case of — Souchel, who had previously been delivered by craniotomy. She was safely delivered by the new operation, and a report was immediately made to the Faculté de Medicine, who were requested to appoint a commission, to superintend the patient's recovery.

MM. Grandelas and Descemet were appointed to this office, and notwithstanding that the bladder was injured, and the mother barely escaped with life, such was the enthusiasm excited in the Faculté de Medicine by their report, that they lost sight of the calm investigation becoming a learned body, and on the strength of one case—and that not a very satisfactory one—voted medals to MM. Sigault and Le Roi, and procured a pension for the former and his patient.

The inscription upon the medal was :

A. 1768. Sectionem Symphyseos Ossium

Pubis. Invenit. Proposuit.

A. 1777.

Fecit feliciter

M. Sigault, D.M.P.

Juvit M. Alphonsus Le Roi, D.M.P.

Persons were not wanting to applaud the inventor and his operation, which was characterised as “the result of inspiration,” and several practitioners in France and Germany followed his example.

M. Sigault himself operated on four other women, one of whom died, and several of the children. He seems, indeed, to have become less confident in its safety and efficacy ; for he refused to perform it unless there was a space of $2\frac{1}{2}$ inches in the short diameter ; and before his death, in such a case, he recommended the Cæsarian Section.

“It was soon found, however, not to merit the high encomiums bestowed upon it. *Every operation was found to have its victim*, although it was several times performed upon women, whose pelves were either not at all, or very slightly deformed, and who, either before or after the operation, were delivered without any extraordinary assistance—a convincing proof that the operation had been, in these cases at least, unnecessarily resorted to.”*

In 1778, he published a “Discours sur les avantages de la Section du Symphyse du Pubis,” in which he examines the usual means of assisting difficult labors, and concludes by stating his reasons for preferring Symphyseotomy to the Cæsarian Section.

* Hull's Second Letter, p. 94

The first persons, I believe, who investigated the propriety and efficacy of the new operation in this country, were Dr. W. Hunter, Mr. Hunter, and Dr. Denman. The former published the result of his enquiries in the *London Med. Obs. and Enquiries*.

"The women of Great Britain," says Dr. Osborn, "are therefore under considerable obligations to the late Dr. Wm. Hunter, who, from an accurate mensuration of those pelves where the Cæsarian operation had actually been performed in this country, and of others still smaller, preserved in his museum, has demonstrated the futility of the section of the symphysis as a succedaneum for that operation, or as a certain means of preserving both the mother and child."

He suggested a combination of the Sigaultian operation with craniotomy, as affording the mother a better chance than the Cæsarian Section. But, as Dr. Osborn remarks, "Prof. Guerard's case is exactly in point, and confirms by experiment what was to be expected *à priori*. The child's head in that case was opened, after the division of the symphysis had been performed; but the Professor was, notwithstanding, foiled in every attempt to deliver, both by the forceps and the crotchet; and the event in the end proved fatal to the mother."*

The next writer who notices the operation, is Dr. Leake, who in his work on the Diseases of Women, 1781, has a few pages upon this operation, of which he is inclined to judge favourably, though with caution. He answers some of the objections urged against it, but admits that more experience was required.

The operation was performed in the year 1782, for the first and last time in this kingdom, by Mr. Welchman, of Kingston,

* Essays in Midwifery, pp. 282, 323.

in Warwickshire. The child was putrid, and the mother died ; but Mr. Welchman thinks that her death was not caused by the operation.*

Dr. Osborn, in his "Essays on Midwifery," 1783, gives a good historical sketch of the operation, and after a very careful examination into the merits of it, he arrives at the conclusion that "*no circumstance whatever, real or imaginary, can ever render it a warrantable operation.*"

Mr. Dease, in his "Observations in Midwifery," 1783, disapproves of the operation. He says, it was "of worse consequence than the Cæsarian ; as it subjected the woman to all the dangers of the latter, without the same advantages of saving the child."

Dr. Hamilton, sen., in his "Outlines of the Theory and Practice of Midwifery," 1784, doubts the efficacy of the operation, and points out its hazard.

Dr. Aitken, "Elements of Midwifery," 1784, says that the operation may be useful "when about half an inch of addition to the short diameter (of the pelvis) is sufficient to allow delivery."

Dr. Hull, in his First Letter, 1790, points out the inadequacy of the operation ; and in his Second Letter, enters more fully into the history of it, and shews that the combination of symphyseotomy with craniotomy (first proposed by Dr. Hunter, and repeated by Mr. Simmons) is worse than the Cæsarian section.

Dr. Denman, in his "Introduction to Midwifery," objects to the operation, except, perhaps, in a case where the life of the child (it being alive) was of such immense importance to the nation, that the mother might fairly run the risk.

* Lond. Med. Journal, 1790. Hull's First Letter, p. 138.

Dr. Burns, "Principles of Midwifery," says that it cannot be adopted with safety or advantage to the mother or child.

Dr. Dewees, "Compendium of Midwifery," 1826, is altogether opposed to the operation.

Dr. Merriman, "Synopsis of Difficult Parturition," observes that the remembrance of this operation "can only be beneficial as it may serve to caution us against the inconsiderate and hasty adoption of modes of practice, unsupported by just reasoning and unsanctioned by experience."

The operation is equally discountenanced by Drs. James Hamilton, jun.* Conquest,† Gooch,‡ Campbell,§ Blundell,|| Ashwell,¶ Ramsbotham,** &c.

Thus, with one exception, the opinion of English authors is against this operation, and that exception is so cautiously worded that it amounts to a hesitation; and, considering the time at which Dr. Leake wrote, and the vivid hopes expressed by his continental contemporaries, his favorable inclination towards it is not surprising.

The contagion of enthusiasm spread rapidly among the French, though some more cautious and philosophical writers held aloof, and others decidedly disapproved of the new operation.

We have seen that M. le Roi, one of the most distinguished practitioners of Paris, adopted warmly Sigault's plans, and aided him in his operations. He also performed the operation himself several times, and published in 1778 his "Recherches

* Outlines of Midwifery, p. 60.

† Outlines of Midwifery, p. 135.

‡ Lectures by Skinner, p. 224.

§ Midwifery, p. 271.

|| Obstetricy, p. 583.

¶ On Parturition, p. 484.

** Lectures on Midwifery in Med. Gaz. 1834, p. 405.

historiques et pratiques sur la Section de la Symphyse du Pubis.” He endeavoured to establish the fact of the natural separation of the symphysis in labor as the basis of the operation which he recommended. He also gives minute details of the operation on — Souchot, and answers the objections which had been raised.

In 1776, before Sigault’s first operation on — Souchot, M. Baudelocque defended a Thesis—“An in partu propter angustiam pelvis impossibili, Symphysis Ossium Pubis secanda?” He determines against the operation, and concludes: “L’expérience n’a pas tardé à confirmer notre jugement: chaque essai qu’on a fait de cette méthode, *a eu pour ainsi dire, sa victime*; et le nombre, pour le temps, n’en est pas petit: effet alarmant des louanges indiscrettes qu’on a donnés à l’auteur de cette operation, et de l’enthousiasme avec lequel on a exagéré ses faux succès.”*

In 1778, M. Roussel de Vaucemes published a Thesis, “De Sectione Symphyseos Ossium Pubis admittenda,” containing an extravagant eulogy of the operation, and a minute account of the cases. As a specimen of the former, I may quote a sentence. After wondering that no one had previously thought of assisting nature in this way, he says: “At tandem Cl. Sigault, D.M.P., hæc alta mente diu revolvens *solus divino quasi afflatus numine* quam monstrarat natura viam ingreditur.”

M. Piet, in 1778, published his “Reflexions sur la section de la Symphyse du Pubis,” in which he shews that the new operation could not fulfil the intention of the inventor; that great disorders accompanied even its slight benefits; and that it was unnecessary in the case of Souchot.

A good deal of information concerning Sigault’s cases may be obtained from the “Analyse de trois Procès verbaux,”

* Baudelocque, l’Art des Accouch. vol. ii. p. 285.

and the Letter of M. de la Planche, D.M.P., published in 1779 and 1781.

M. Sue, in his "Essais historiques sur l'Art des Accouchemens," gives a comprehensive review of this operation, and reprehends the disputes which had arisen between the Faculté de Medicine and the Surgeons of Paris.

M. Saccombe, 1784, throws great ridicule upon the operation.

Mad. Lachapelle, "Pratique des Accouchemens," agrees with Baudelocque.

M. Maygrier, "Elemens de la Science et de l'Art d'Accouchemens," 1814, expresses neither approval nor disapproval of the operation, but gives the details necessary for its performance.

M. Capuron, "Cours d'Accouchemens," 1828, takes a "parti moyen," and says that "the operation may be useful or advantageous in certain circumstances, though it may be very difficult, not to say impossible, to say what these are in practice."

M. Gardien, "Traité des Accouchemens," 1826, enters into a lengthened examination of the operation, and a comparison of it with the Cæsarian Section. He points out several cases in which symphyseotomy may be practicable and useful.

M. Velpeau, "Traité des Accouchemens," without overvaluing the operation, thinks that it may be useful when four, five, or six lines of additional space would allow the head to pass.

The operation has been performed in Italy. It has also been modified by Prof. Catolica, after the suggestion of Desgranges and Champion. Instead of dividing the symphysis, the ossa pubis were cut through, nearer their junction with the ossa ilia, and by this means a positive increase in the

antero-posterior diameter was gained. M. Galbiati performed this operation in 1819, and it proved fatal.

Shortly after Sigault's first proposal of the operation to the academy, M. Louis, the secretary, mentioned it cursorily in a letter to the celebrated Camper, who was greatly struck by its feasibility. He published a letter in 1773 or 4, to M. van Gesscher about it: "*De emolumentis sectionis synchondroseos ossium pubis in partu difficili;*" and referring to it, he says: "*Certam tandem, dummodo possibile sit, excogitem methodum, qua capitis demolitionem per uncum, æque atque Cæsaream sectionem evitare possim;*" and he concludes in the following terms of admiration: "*Tanto perfusus gaudio inventorem ambabus ulnis amplecti voluissem, si licuisset ab ore ejus excellentissimam hanc cogitationem vel schema accipere.*"

President Siebold was equally struck with it, and performed it upon a patient, who recovered. In 1779 he published his "*Comparatio inter Sectionem Cæsarian et Synchondrotomiam.*" However, he afterwards felt that his opinion was adopted without adequate consideration, for Baudelocque quotes a letter from him to the Royal Academy, in which he says: "*Je regrettai vivement, comme je m'en repens peut-être encore, de m'être laissé séduire aux appas de l'opération nouvelle.*"

Dr. E. Bentely, in 1779, chose this subject for his inaugural Thesis, and investigated carefully the amount of space to be gained by this operation. From the experiments of Ripping of Paris, and Lobstein of Strasburg, he concludes that the antero-posterior diameter will never gain by this operation more than *four* lines, and that consequently it is not applicable to cases requiring the Cæsarian section.

In 1779, Dr. Weidmann published his "*Comparatio inter sectionem Cesaream et dissectionem cartilaginis et*

ligamentorum pubis," &c. He had been present at both operations, of which he gives a description, as well as a sketch of their history. He thinks that if even symphyseotomy be justifiable, it is when the short diameter is three inches ; but even then he asks " whether it may not be better to bring on labor at the seventh month ? for by that means less danger will be incurred by the mother, and probably the child may be delivered alive."

Prof. Loder, about 1780, published a dissertation in favour of the operation, and recommended it when the smaller diameter of the pelvis is below three inches.

M. Spiering, " Die Pratische Geburtshülfe," 1801, has given a literary history of the operation. He decides that symphyseotomy cannot supersede the Cæsarian section.

M. Steidele, " Abhandlung von der Geburtshülfe," 1813, is doubtful of the operation in all cases, and opposed to it in most. He rejects it as a substitute for the Cæsarian section.

M. Ritgen, " Die Anzeigen der Mechanischen Hülfen bei Entbindungen," 1820, has added some valuable measurements bearing upon the question. He concludes that the operation is incapable of superseding hysterotomy.

M. Osiander, " Die Ursachen und Hulfsanzeigen der Geburten," &c. 1833, enumerates many objections to the operation, and admits its very rare applicability.

The operation is treated of by the following authors:—Froriep,* Carus,† Busch,‡ Cohnstein,§ Rosshirt,|| and Kilian,¶ and the general testimony is unfavorable to it.

* Handbuch der Geburtshülfe, p. 405.

† Gynæcologie, vol. ii. p. 369.

‡ Lehrbuch der Geburtskunde, p. 657.

§ Handbuch der Geburtshülfe, p. 406.

|| Die Anzeigen zu den Geburtshülflichen Operationen, p. 194.

¶ Die Operative Geburtshülfe, vol. ii. p. 867.

From these researches we may conclude that the highest authority is opposed to the operation, and even those who do not entirely exclude it, limit it to a class of cases which very rarely occur. Almost all are agreed that it cannot be substituted for the Cæsarian Section.

We shall now examine the merits of the operation a little more minutely.

The *object of the operation* is to increase the short diameter of the pelvis, by the enlargement of the arch formed by the ossa ilia and pubis, so as to allow of the passage of the child in cases where it must otherwise have been extracted by an artificial opening; and by this means afford a greater chance for life, both to the mother and child.

The *nature of the aid* afforded, is easily comprehended, though the amount is evidently overrated by the early advocates of the operation. The cartilage of the symphysis pubis being divided, the pressure of the head, or the assistance of the operator, may separate the ossa pubis, at the expense of some of the sacro-iliac ligaments; for the separation of the ossa pubis will be *exactly in proportion to the yielding of the sacro-iliac synchondroses*; so that, if the latter were ankylosed, the operation would fail altogether.

Again, it must be remembered, that owing to the posterior situation of the sacro-iliac synchondroses, the space gained will be *mainly in the oblique diameter of the pelvis; next to this in the transverse, and least of all in the antero-posterior diameter*.

But it is from the *last mentioned diameter* being too short that the difficulty exists, and therefore *upon the amount gained in it*, depends the successful issue of the operation.

The entire question turns upon this point. *If by the separation of the ossa pubis, so much space be gained as will make up the difference between the sacro-pubic diameter in a deformed pelvis, and the same diameter in an ordinary one, then the operation is at least mechanically adapted to the object in view.*

Hence it is very important to ascertain as nearly as we can, how much may thus be added to the antero-posterior diameter. We know from Sigault's and Le Roi's case, that the ossa pubis may be separated four inches : how much will this increase the short diameter ?

Dr. Bentely, in his dissertation (as already mentioned,) quotes the experiments of Ripping of Paris, and Lobstein of Strasburgh, in support of the conclusion that the utmost gain by the operation is *four lines* in the short diameter, and Dr. Aitken says *half an inch*.

I feel satisfied myself that *half an inch* is the very utmost that can be gained, except by such violence as would be utterly unjustifiable.

But then Dr. Leake observes that the head will press into the opening, and "it will therefore follow that as much of the occiput, or hind head, as is intruded into an aperture at the pubis of two inches and a half, so much precisely will be the space gained by this operation, and superadded to the short axis of the pelvis from sacrum to pubis, which will be equal to the enlargement from side to side—the circumstance here contended for."

This is undoubtedly ingenious, but not quite correct, inasmuch as the long diameter of the head at the upper outlet corresponds with *one of the oblique*, and *not with the sacro-pubic diameter* ; so that the occiput would correspond pretty nearly with the acetabulum, and the tuber parietale

with the interval between the ossa pubis. In this situation, no part of the head could pass through the opening, unless the operator changed its position. Further, Dr. Osborn has justly remarked, that this pressing into the opening would be at the expense of so much injury to the bladder and soft parts, as would render the operation unjustifiable.

How far the object of the operation (*i. e.* substituting one of less danger for the Cæsarian Section) has been attained, will best be seen by a statement of the operations performed, and their results.

For the following list, I have been mainly indebted to Dr. Hull's second letter.

TABLE I.—CASES IN WHICH THE MOTHER SURVIVED.

- Case 1. 1778. By M. Sigault, on ——— Souchot, at Paris. Short diameter of the foetal head, $3\frac{3}{4}$ inches. From pubis to sacrum, $2\frac{1}{2}$ inches. Child born alive, but immature. Mother recovered. Urethra and bladder injured. Incontinence of urine for some time.
- Case 2. 1778. By M. Sigault, on ——— Blandin. From sacrum to pubis about 3 inches. Child dead. Mother recovered, and afterwards had a child *naturally*.
- Case 3. By M. Sigault, on ——— Verderais. Pelvis *said* to be distorted. Child dead. Woman afterwards delivered of a *living* child by a midwife.
- Case 4. at La Forets aux Gobelins. Child still-born. Mother able to walk on 15th day.
- Case 5. 1779. By M. Le Roi, on Julie Collet. Short diameter of foetal head $2\frac{1}{4}$ inches. From sacrum to pubis $2\frac{1}{2}$ or $2\frac{2}{3}$ inches. Child extracted by feet, and

was restored. Ossa pubis said to have been separated almost 3 inches. Woman walked on the 12th day, but afterwards had prolapsus uteri.

- Case 6. 1779. By M. Le Roi, on — du Belloy. Short diameter of foetal head $3\frac{2}{3}$ inches. From sacrum to pubis $2\frac{1}{4}$ inches. Child small, and extracted footling. Wound said to be healed on 5th day, and she walked on the 11th. Afterwards delivered *naturally* of one child by Le Roi, and two by Mad. du Sellin, a midwife. Doubtful whether the operation was really performed. Prolapsus uteri afterwards.
- Case 7. 1785. By MM. Le Roi and de Matthiis, on — Huguet. Short diameter of foetal head $3\frac{1}{3}$ in. From sacrum to pubis more than 3 inches. (*Baudelocque*.) Child healthy. Ossa pubis said to have been separated more than $2\frac{1}{2}$ inches. Woman well on 17th day. Prolapsus uteri afterwards.
- Case 8. 1785. By MM. Le Roi and de Matthiis, at Mad. Morlai's, a midwife. From pubis to sacrum 2 in. according to Le Roi, above 3 according to Baudelocque. Child living. Mother recovered very well.
- Case 9. 1778. By M. Cambon, on El. Loutre. Pelvis not much distorted. Child died. Mother recovered very well. Had been previously twice delivered of dead children by the forceps.
- Case 10. 1780. By M. Cambon, on El. Loutre, a second time. Child large and healthy. Wound healed in 27 days.
- Case 11. 1779. By M. Cambon, on — Marchant. Inferior outlet very much contracted. Child extracted alive by the forceps. Mother able to walk in 30 days.
- Case 12. 1778. By M. Despres de Menmeurs, on A. Berrou. From pubis to sacrum stated to be $1\frac{1}{2}$ or $1\frac{2}{3}$ inches.

Child dead. It is probable that only the integuments were divided, as she sat up on the first day, and walked on the third. Delivered naturally afterwards.

- Case 13. 1778. By M. Siebold, on Mad. Markard. From sacrum to pelvis, from $2\frac{3}{4}$ to 3 inches. Child dead. The urethra sloughed. Wound healed in 18 months.
- Case 14. 1779. By M. Van Damme, on ——— Brammier. Pelvis not deformed. Child extracted by forceps, and much injured. Mother endangered. Had borne three children *naturally*.
- Case 15. 1779. By M. Duret of Brest, because of an exostosis, the size of a nut, on the lower part of the sacrum. Still-born child extracted by forceps. Laceration of perineum, and wound. Ossa pubis exfoliated. Anterior part of vagina and bladder destroyed by gangrene. Prolapsus uteri and incontinence of urine.
- Case 16. 1779. By M. Van Munster, on ——— Van Loven. From sacrum to pubis, $2\frac{3}{4}$ inches. Deformity from rickets. Child dead, and extracted by forceps. Mother well in six weeks.
- Case 17. 1779. By M. Van Munster, on ——— Verploeg. From sacrum to pubis scarcely 3 inches. Pelvis distorted by rickets. Child saved. Woman well in 6 weeks.
- Case 18. 1779. By M. G. on ——— Leblanc. Child extracted with forceps. Delivered *naturally*, and very rapidly, afterwards.
- Case 19. 1780. By a pupil of the College of Cadiz. Woman recovered. Operation believed to have been unnecessary.
- Case 20. . By M. Brodthlag, jun. Child dead. Mother well in 22 days. Had borne two children before.

- Case 21. . By M. Groschans. Mother recovered. Not stated whether child was born alive.
- Case 22. 1780. By Don Juan Delhuyar, in Spain. Pelvis very much contracted. Child preserved. Mother walked in 38 days.
- Case 23. 1780. By Don Antonio Delgado, in Spain. Child preserved. Mother recovered.
- Case 24. 1783. By M. Damen, on — Stols. Lower outlet narrow. Child preserved. Mother recovered quickly.
- Case 25. 1785. By M. Damen, on — Stols. Child preserved. Mother recovered quickly.
- Case 26. 1786. By M. Verdier Duclos. From sacrum to pubis only $1\frac{3}{4}$ inches. Child died at birth. Ossa pubis said to have been separated $2\frac{1}{8}$ inches.
- Case 27. . By M. Löffler. Mother well in a month. Not stated whether the child was saved.
- Case 28. . By M. Desmarests. No mention made of child. Mother escaped with life, but suffered from exfoliation of the ossa pubis, and other accidents.
- Case 29. . By a Surgeon in Prussia. No mention of child. Mother survived, but suffered from gangrene, and from exfoliation of the ossa pubis.
- Case 30. . By M. Der. Child preserved. Mother recovered.
- Case 31. . By M. Stock, successfully.*
- Case 32. . By M. Petruni of Naples. Child preserved. Mother recovered.†
- Case 33. By Dr. Gelauff. Child preserved. Mother saved.‡

* Archives Gen. vol. xxiv. p. 447. *Velpéau*.

† Bull. de Therap. vol. vii. p. 130. *Ibid*.

‡ “ A woman, æt. 26, and who had been twice before delivered of dead children by means of the forceps, became a third time pregnant. Dr.

TABLE II.—CASES IN WHICH THE MOTHER DIED.

- Case 1. 1778. By M. Sigault, on ——— Vepres. Short diameter of the fœtal head, $3\frac{7}{12}$ inches. From sacrum to pelvis, 22 to 23 lines. Child dead born. Mother lived only five days, and in great agony. Sacro-iliac symphyses separated in part, the periosteum detached, and matter formed. Ossa pubis separated $1\frac{1}{2}$ inch by the operation.
- Case 2. . By M. Le Roi, in Fauxbourg St. Germain. Short diameter of fœtal head $3\frac{5}{12}$ inches. From sacrum to pubis, $2\frac{1}{2}$ inches. Child preserved. Mother died on the 8th day. Sacro-iliac symphyses separated, and matter formed: uterus gangrenous. Ossa pubis separated not quite two inches during the operation.
- Case 3. 1778. By MM. Lescardè and Retz, at Arras. From pubis to sacrum $2\frac{10}{12}$. (*Sue.*) Child shewed scarcely any signs of life. Mother died on the third day.

Gelauff, who had attended her in her former pregnancies, *unwilling to expose himself to the recurrence of so much difficulty as he had met with before, and wishing, moreover, to deliver a living child*, resolved to perform the operation of dividing the symphysis pubis, for the purpose of increasing the antero-posterior diameter of the inlet of the pelvis, which he ascertained to be less than 3 in. The operation was performed between 5 and 6 o'clock, P.M. we are told, according to the rules of art; and the bones were separated a little less than half an inch. The pains did not come on briskly for several hours afterwards; but about 10 o'clock they increased so much, that very soon afterwards the child was expelled alive. The placenta also came away as after natural labor. The recovery was altogether so satisfactory, that the woman was able to walk about at the end of the fourth week."—*Med. Chir. Rev.* Oct. 1840, p. 521.

- Case 4. 1778. M. Nagel, on A. M. Schmiddrinn. From pubis to sacrum, three inches. Child lived a quarter of an hour. Sacro-iliac symphyses moveable: the wound, vagina, and uterus gangrenous. Mother died on 8th day.
- Case 5. 1778. By M. Bonnard. From sacrum to pubis, 2 inches. Child preserved. Section of symphysis pubis not completed, owing to ossification. Cæsarian Section.
- Case 6. . By M. Guerard, on ——— Langens. From sacrum to pubis, $2\frac{1}{2}$ inches. Child dead, because it came footling, and the head had to be perforated before it could be extracted. Mother died in 11 hours.
- Case 7. 1781. By M. Cambon, on ——— Hucq. From sacrum to pubis, $2\frac{7}{8}$ inches. Funis presented. Child lost. Mother died. Right sacro-iliac symphysis separated 7 or 8 lines, and a great quantity of sanious matter formed.
- Case 8. 1781. By M. du Chaussoi, on ——— Françoise. From pubis to sacrum, $1\frac{7}{8}$ inches. Child dead before operation. Mother survived only 52 hours. Usual appearances on dissection.
- Case 9. 1782. By M. Lavaguigno. From pubis to sacrum, $2\frac{5}{8}$ inches. Malacosteon. Child supposed to be dead, and extracted by crotchet *alive*. Mother lived only 12 days. External parts, vagina, and uterus gangrenous.
- Case 10. 1782. By Mr. Welchman, of Kington, Warwickshire, on Mary Ordway. From pubis to sacrum, 24 inches. Malacosteon. Child putrid. Mother lived only 6 days.

- Case 11. 1783. By M. Riollay. From sacrum to pubis, 3 inches. Child dead some time. Mother only lived $1\frac{1}{2}$ hour. Sacro-iliac symphyses torn.
- Case 12. 1783. By M. V——. From sacrum to pubis stated to be $1\frac{2}{3}$ inches. Child dead. Mother died immediately after delivery.
- Case 13. at Naples. Mother died from hemorrhage. Life or death of child not stated.
- Case 14. 1785. By M. de Matthiis, on M. Rouille. Short diameter of foetal head, $3\frac{1}{4}$ inches. From sacrum to pubis, $2\frac{1}{2}$ inches. Child dead. Mother died on 9th day. Great injury.
- Case 15. 1829. By M. Catolica. Child lost. Mother died.* Vagina and uterus gangrenous.
- Case 16. 1836. By M. Galbiati, of Naples, on Marie de Stephano. Pelvic deformity. Child preserved. Mother died.†

Thus, in 49 cases, 16 mothers died—or about 1 in 3; and of 40 cases, the child was born alive in 11, and dead in 19, or in one half.

M. Figueira enumerates 157 cases, of which 72 mothers died.

A slight analysis of these tables may facilitate our estimate of the value of the operation.

1. It has been performed unnecessarily, as was proved by a subsequent natural delivery. (*Table I. Cases 2, 3, 12, 18.*)

2. Without any cause, as in *Case 14*, the patient having

* *Lancet*, 1829, vol. ii. p. 192.

The operation is said to have been performed at Constantinople, at Frankfort, at Rochefort sur Vidame, and in Artois, but the results are not given.

† *Il Filiatre Sebezio*, July, 1837. *Encyclographie*, Aug. 1837.

borne children naturally, and there being no deformity ; and in *Case 7, Table I.*, where there was sufficient space.

3. Without the possibility of benefit from it, as in *Case 26, Table I.* where the antero-posterior diameter was only $1\frac{3}{4}$ inch.

4. According to *Table I.*, although 33 mothers recovered, 10 children were lost, 14 saved, and 1 much injured. Of 7 nothing is stated. In *Table II.*, 16 mothers were lost, 5 children only saved ; 9 were dead, 1 much injured, and of 1 nothing is stated. So that,

5. According to *Table II.*, 16 mothers were sacrificed to save 5 children.

6. Although, according to *Table I.*, 33 mothers recovered, yet to save 14 children they paid very dearly—for 1 had the bladder and urethra injured ; 2 had incontinence of urine ; 3 had prolapsus uteri. In 1, the bones of the pelvis exfoliated, the cervix uteri and posterior part of bladder were gangrenous, and several were endangered by the operation, whilst of a great number no details are given.

The *advantages* of the operation, as enumerated by its supporters, are :

1. That it substitutes an operation of less danger for the Cæsarian section ; but this, we have seen, is not true, for although 1 in 3 of the mothers only are lost by it, (rather less than by the Cæsarian section,) yet those who recover are liable to accidents which fully counterbalance this slight advantage.

2. That it affords a better chance of saving the child ; but we have seen that only one-half of the children were saved, whilst by the Cæsarian section, more than two-thirds were preserved.

3. That it is a less painful operation. This is true as regards the period of operating ; but if the period of

convalescence be included with the sequelæ which occasionally occur with each, I should doubt the fact.

4. “ The section of the pubes which allows the child to be born by the natural passage, carries not with it those ideas of cruelty which attend the Cæsarian operation, where the patient is, as it were, embowelled alive.” (*Leake.*)

This is very plausible but very false humanity.

The *objections* against the operation, are to my mind unanswerable, although some that have been put forward as such have been refuted by experience. It must be remembered that the operation is contemplated for those cases in which the Cæsarian section would otherwise be necessary.

1. For these cases the operation is inadequate. In a former essay, we have seen that the Cæsarian operation ought not to be performed in any case where the antero-posterior diameter is more than 2 inches, inasmuch as the delivery can be accomplished by a less hazardous method. Now as the Sigaultian operation adds but half an inch (at the utmost), this would increase the antero-posterior diameter to $2\frac{1}{2}$ inches. But it has been ascertained that a living child cannot pass through a pelvis whose short diameter is less than 3 inches; consequently, the Sigaultian section cannot avail in these cases, unless craniotomy be superadded. But the mortality of the two would be greater than that of the Cæsarian section, for 1 in 3 of the mothers would be lost, and all the children, by the combined operations; whereas by the latter, although 1 in $2\frac{1}{4}$ of the mothers are lost, more than two thirds of the children are saved.

2. Even if the space gained would secure the delivery, the mortality of mothers and children would not justify its preference to the Cæsarian section—especially if we take into account the sequelæ.

These objections appear to me quite conclusive against the operation ; but as others have been adduced, it may be as well to enumerate them.

3. The cartilage of the symphysis may be ossified ; which will render the operation impracticable, even after it have been commenced. (*Table II. Case 5.*)

4. Great injury may be inflicted by the knife on the bladder or soft parts within the pelvis.

5. Equal injury may happen from the violence used in separating the ossa pubis.

6. The soft parts may be injured by pressure against the edges of the divided ossa pubis.

7. The sacro-iliac synchondroses may be ruptured past remedy.

8. The divided cartilages may not unite. Experience, however, has shewn the groundlessness of this objection.

9. The admission of external air may excite inflammation.

These latter objections have of course a certain weight, but hardly sufficient to prohibit the operation, if it were adapted for the cases in which it has been proposed.

But there is another class of cases for which it would seem at first sight more suitable, and which indeed appear to have been contemplated, by those who recommend its performance, where the antero-posterior diameter of the upper outlet is three inches. I mean those cases, where the difficulty is too great for the forceps, and in which (as we have seen,) craniotomy is necessary. Here the gain of half an inch might enable a living child to pass. But the operation is objectionable in these cases, because of the results ; for independent of the ill consequences in those who recover, we find that 1 in 3 of the mothers die, and only half of the children are saved ; whilst, although all the children are sacrificed by craniotomy, only 1 in 5 of the mothers die.

And it must also be borne in mind, that these results of craniotomy have occurred under more unfavorable circumstances than those of the Sigaultian operation.

From these considerations, I trust that my readers will agree with me in the following conclusions :

1. That the Sigaultian operation is undeserving of the encomiums passed upon it, inasmuch as it offers no increased chance of safety to the mother or child—the statistics of the cases in which it has been tried having shewn that 1 in 3 of the former, and one-half of the latter are lost ; besides that in those of the mothers who recover, much inconvenience is experienced from the sequelæ of the operation.

2. That it is perfectly inadmissible as a substitute for the Cæsarian section, because the utmost space gained by it would not permit the child to be born alive in any case in which the Cæsarian operation *ought to be* contemplated ; and if the child must in addition be destroyed, the combined mortality of the mothers and children would then be far greater than from the Cæsarian operation.

3. That it is equally inadmissible as a substitute for craniotomy alone, in cases where the forceps are inadequate, because the consequences to the mother are more serious from it than from craniotomy.

If, as I believe, these conclusions are correct, I need only add an account of the mode of performing the operation, not as a model, but to complete its history. Perhaps the best mode of doing this, is to give the account of one of M. Sigault's cases, abridged by Dr. Osborn.

“Mons. Sigault, with a common bistoury, cut through the integuments and linea alba, beginning the operation at the upper and central part of the symphysis pubis ; then

introducing his fore finger as a director, he cut through the ligaments and cartilage ; immediately on the completion of which, the two ossa pubis, with a peculiar noise, spontaneously separated two inches and a half : this was demonstrable, for M. Le Roi laid his four fingers into the opening. M. Sigault immediately introduced his hand into the uterus, broke the membranes, and brought down the feet. M. Le Roi accomplished the delivery. The whole operation, both section and delivery, was finished in five minutes. The child was born alive. A ligature was passed round the body of the mother, to keep the pelvis firm. The patient having no bad symptoms, was left till the next day, when every circumstance continued favorable ; she had passed her urine voluntarily twice, there had been no hemorrhage, and she had suffered little pain."

AN ESSAY
ON
THE FUNIS UMBILICALIS
IN
THE HUMAN SUBJECT.



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HAVING some time ago contributed some observations upon the length of the umbilical cord, and its influence upon parturition,* it has appeared to me to be worth while comprising in one essay, all the facts on record which bear upon the history of this structure, many of which were unnoticed in the paper alluded to.

The funis, during foetal life, is the connecting link between the mother and child, and may be compared to the stem of a tree, through which nourishment is transmitted from the root (the placenta), to the branches (the child).

Its functions are limited to foetal life, and its existence terminates with its functions.

It has been stated by Professor Burns of Glasgow, that “when the ovum is first visible in the uterus, there is no cord, the embryo adhering directly to the involucra; but it soon recedes, and within the sixth week a cord of communication

* Dublin Journal, vol. ii. p. 21.

is perceptible.”* Hunter had previously made a similar statement. This, however, has been controverted by other authorities, and most recently by Breschet and Velpeau; as the result of many examinations, they conclude, that at the earliest period, a cord is perceptible if the ovum be perfect; and the latter author attributes the contrary statements to the descriptions being taken from imperfect or injured ova. As far as I have had opportunities of examination, I must concur with M. Velpeau.

It is generally visible about the fifteenth day, when it rather exceeds the length of the fœtus. Up to the third week it is thin and cylindrical; from the third to the ninth it increases in size, and we find two or three vesicular swellings with narrow intervals; the last swelling persisting the longest. It contains at this period the vitelline duct, with the omphalo-mesenteric vessels, a portion of the urachus, the fœtal intestines at its umbilical extremity, the blood-vessels, and some gelatine.

About the end of the second month the intestines are enclosed in the abdomen, and the vitelline duct and urachus are obliterated, so as scarcely to be detected afterwards.

If we examine the funis at the termination of pregnancy, we shall find much that is interesting and important in its connections, structure, and varieties.

It takes its origin from the surface or circumference of the placenta. Oslander† has carefully examined the point of connection in thirty-six cases. In two it took its rise from the circumference, forming what has been called a battledore placenta; and in one only, exactly from the centre of the

* Principles of Midwifery, 9th edit. p. 226.

† Handbuch der Entbindungskunst, vol. i. p. 482.

cake. In most cases it was about two inches from the edge, (the majority of placentæ being about six inches in diameter.) The other extremity is inserted into the umbilicus, nearly in the centre of the entire length of the child, but so much nearer to the pubis, as the child is short of the full term of utero-gestation.*

The thickness of the cord varies according to the quantity of gelatine it contains. It is generally about as thick as the little finger, but sometimes much thinner; and Mauriceau† mentions having seen it as thick as his arm. Froriep‡ remarks, that its size and thickness are in the inverse ratio to the increase of the child. I am not aware that this has been verified by other authors; and it is certainly contrary to the few observations I have made.

Nothing can be more variable than the length of the cord. Dr. Davis§ says, that a cord of two inches long has been met with; Guillemeau,|| one of two inches and a half; Montault,¶ one of four inches; Meissner,** one of five inches; Mauriceau,†† Baudelocque,‡‡ and Morlanne,§§ one of six inches; Haighton,||| one of seven inches; Dr. Klugè,¶¶ one of eight inches and a half; and Dr. Montgomery,*** two of eight or nine inches.

* Velpeau, *Traité Complet de l'Art des Accouchemens*, Brussels ed. p. 167.

† *Maladies des Femmes Grosses*, Obs. 301.

‡ *Handbuch der Geburtshülfe*, p. 155.

§ *Obstetric Medicine*, p. 1080.

|| Thèse, No. 120. Paris.

¶ *Archives Gen. de Med.* vol. xxix. p. 567.

** *Progrès des Accouch.* au 19^{me} siècle.

†† *Mal. des Femmes Grosses*, Obs. 640.

‡‡ *L'Art des Accouch.* vol. i. p. 251.

§§ *Journal des Accouch.* vol. ii. p. 18.

||| *Lancet*, 1828, vol. ii. p. 227.

¶¶ *Siebold's Journal*, vol. viii. p. 847.

*** *Dublin Journal*, January, 1834, p. 433.

Dr. Hamilton remarks, "Two cases have occurred to the author, where the navel string was naturally so short, that it became necessary to tie it, and to cut it within the vagina; consequently its length could not have exceeded six inches."*

On the other hand, M. Baudelocque† saw one of 46 inches; M. Heritier, one of 57 inches, which was coiled five times round the neck; M. Morlanne,‡ one of five feet; M. Dezeimeris, one of 28 inches in a fœtus of four months; and M. Velpeau,§ another of 31 inches at six months.

These cases, however remarkable, being isolated, afford us no means of judging of the frequency of their occurrence, nor of the ordinary length of the funis. I have been able to find but few tables of measurements in any authorities to which I have access. Adelman of Fulda has given 49 cases; Henne of Copenhagen, 130, in Siebold's Journal of Midwifery; and Osiander,|| 32—making in all 211. To these I can add 289 cases from the records of the Western Lying-in Hospital and my own practice, making a total amount of 500. The measurements were as follows:

In 6 the cord was 12 inches long.

2	...	...	13	...
12	...	...	14	...
22	...	...	15	...
37	...	...	16	...
10	...	...	17	...
127	...	...	18	...

* Practical Observations, Part ii. p. 69.

† L'Art des Accouchemens, vol. i. p. 252.

‡ Gardien, Traité des Accouchemens, vol. ii. p. 165.

§ Embryologie, p. 58.

|| Handbuch der Entbindungskunst, vol. i. p. 504.

In 16 the cord was 19 inches long.

45	...	...	20	...
29	...	...	21	...
37	...	...	22	...
12	...	...	23	...
77	...	...	24	...
10	...	...	26	...
8	...	...	25	...
5	...	...	27	...
12	...	...	28	...
2	...	...	29	...
13	...	...	30	...
3	...	...	31	...
1	...	...	32	...
3	...	...	33	...
7	...	...	36	...
1	...	...	42	...
1	...	...	46	...
1	...	...	48	...
1	...	...	54	...

Thus we find that the most frequent length was 18 inches, the next 24, and the next to that 20 inches ; so that we may agree with those writers who state the average length of the cord to be between 18 and 24 inches. Extremely short cords must be very rare, and scarcely to be calculated on in practice—since out of 500 cases, none were under 12 inches. Only four were above 3 feet.

Siebold, in his report of the Marburg Lying-in Hospital, states that the shortest cord was 13 inches, and the longest 42 inches.

I have no data by which to test the observation of Osiander, that male children have generally longer cords than females.

As to the anatomical structure of the cord :—It consists of two arteries and one vein,* imbedded in a semifluid jelly, and inclosed in two membranous sheaths† derived from the amnion and chorion. The latter forms the inner sheath, and the former the external one. It has been advanced by some physiologists, that the outer coat, or amnion, is a prolongation of the epidermis of the fœtus ; but this representation is refuted by the existence of these membranes before the closure of the abdomen.

The colour of the sheath is generally whitish, but occasionally it is found yellow, brown, or greenish.

The *umbilical vein* is of larger calibre than either artery, but having weaker parietes, so that when cut across it collapses. It has neither knots nor valves, but pouches resembling varices are sometimes formed in it by dilatation. It conveys blood of a dark purple colour, with very little if any excess of oxygen.

It is formed by the concentration of the smaller placental vessels, and after entering the abdomen by the umbilicus, it terminates at the liver, transmitting its contents partly through the hepatic veins, and partly through the *ductus venosus*.

The *two arteries* arise from the hypogastrics, are much smaller, though longer than the vein, and having much thicker coats, in consequence of which their mouths remain open if the cord be cut across. In their course through the funis, they wind spirally from left to right, (eleven times out of twelve ;‡) and form false knots or loops, which

* Gardien observes that this arrangement ceases when the vessels subdivide in the placenta, there being then only one artery to each vein. *Traité compl. des Accouch.* vol. ii. p. 165.

† *Vagina funiculi umbilicalis*, Osiaander. *Investitura*, Hoboken. *Intestinalium*, Bankeri.

‡ Velpeau, *Embryologie*, p. 60.

are said to be more numerous in first children. In Germany the “priestesses of Lucina” take these knots as an augury, indicating the number of children a woman is to have.

On arriving at the inner surface of the placenta, each artery divides and subdivides, until their branches terminating in, and interlacing with, the radicles of the umbilical vein, form the mass of the placenta.

There is no perceptible difference in color between the blood they carry, and that returned by the umbilical vein.

By all British authors, I believe, and by most Continental, the pulsation of these arteries is said to be exclusively derived from the foetal heart, and dependent upon it; but this is denied by Oslander, who contends that they have an independent action, at least under certain circumstances. In support of this view, he adds in a note: “More than once I have seen the artery pulsate, when the placenta, placed in a glass vessel of warm water, was brought into contact with the positive pole of a galvanic battery, or even when the water in which it was placed, was so influenced. The umbilical artery of a still-born child has also been found pulsating, when no pulsation could be detected in the heart, and when it was found impossible to re-animate the infant.”* The arteries, he further observes, continue to pulsate, if the placenta be separated from the uterus, and placed in warm water.

After the birth of the child, if the cord be not divided, its pulsations cease naturally about fifteen minutes after respiration is fully established: there are exceptions to this, however, and Dr. Dewees has recorded a case where the pulsation continued an hour and a half after the cord was tied and divided.

At the foetal end of the cord, we may detect more or less of the obliterated urachus.

* Handbuch der Entbindungskunst, vol. i. p. 489.

A long-continued controversy has been maintained, as to whether the funis possesses lymphatics or nerves ; and though the evidence in favor of their presence is in my mind tolerably satisfactory, yet, as demonstration is not easy, there remains room for scepticism in those so inclined.

Lymphatics are stated to have been seen by Everhard, Pascoli, Needham, and Röslin, according to Schroeger.* They were demonstrated by Wrisberg, as pointed out by his pupil Michaelis.† They were afterwards seen by Uttini‡ and Reuss. Hunter, Hewson, Cruickshank, and Mascagni failed in detecting them, and denied their existence.

Osiander injected them with quicksilver in April, 1803, and also subsequently.§ He could never find them at the extremities of the funis, but merely infers their connection with the placenta and fœtus.

The following extract from the *Dublin Journal*,|| contains a summary of the results of Fohmann's experiments, by the late Dr. William West, of this city. "The funis consists, its blood-vessels excepted, of a tissue of absorbents, which is so close that the point of a needle cannot be introduced into any part of it without wounding one." "To fill them with mercury, nothing more is necessary than to pierce the sheath with a small lancet, and then inject the metal through a fine tube. By injecting with mercury the tissue of absorbents at the placental extremity of the funis, and driving the metal

* De Functione Placentæ Uterinæ ad virem illustrem S. T. Soemmering epistola. Erlangen, 1799.

† Observ. circa placentæ ac funiculi umbilicalis vasa absorbentiâ. Gött. 1790.

‡ Ueber die Einsaugenden Gefässe des Mutterkuchens, in Meekel's Archiv. vol. ii.

§ Hanbbuch der Entbindungskunst, vol. i. p. 494.

|| Vol. v. p. 293.

towards the placenta with the handle of a scalpel, we may sometimes succeed in injecting a net-work of absorbents that is spread out between the placenta and its investing membrane. I never saw any vessels rising from this net-work, and ramifying into the membrane (the chorion), as has been observed with respect to the sheath of the funis ; and I but seldom discovered any branches penetrating the parenchyma of the placenta. Whither they proceed when they do penetrate, I have not been able to make out ; but I am inclined to think they reach its uterine surface.” “ On the passage of the tissue of absorbents of the funis into the abdominal region of the fœtus, the superficial ramifications at the distance of a few lines from the umbilical ring, become so very minute as to be scarcely discoverable by a strong lens, even when injected with mercury. On the other hand, the deeper-seated vessels gain in strength what they lose in diameter, so that we can employ the handle of the scalpel to drive the mercury onward through them, without any fear of their rupture. On reaching the umbilical ring, they become somewhat larger ; and some of them run into the dense tissue of absorbents between the epidermis and the cutis, of which the sheath of the funis is only a continuation. The rest unite into branches, which proceed under the cutis, and at the distance of some lines from the umbilical ring, generate a lymphatic trunk, which, running in a circular direction, forms another ring.”

And in the next Number of the same Journal* we find the following remark : “ In the last number of this journal we inserted a notice of Fohmann’s discovery, and successful injection of lymphatics in the placenta and funis of the human race. More recently, a similar investigation has been

* Vol. v. p. 482.

undertaken, and with an equally satisfactory result, by Dr. Montgomery, of this city, who has succeeded in injecting with mercury great numbers of these delicate vessels, running along the cord, and for the most part, following the spiral course of the umbilical arteries.”

The existence of *nerves*, like that of lymphatics, has been equally disputed, and on either side of the question great names are arrayed. They have been demonstrated in the funis of calves by Larrey (in 1812,) and Teichmeyer, and also by Sir E. Home* and Kilian.†

I do not find, however, that the knife of the anatomist has been able to do more than to detect them at the abdominal insertion of the cord, though arguments have been adduced strongly confirming the inference, that they actually accompany the entire development of the umbilical vessels to their termination.

Osiander believes in their presence, and mentions, as in favour of this opinion, the occurrence of spasmodic action of the abdominal muscles, when the cord is divided ; the action of galvanism, and inflammation attacking the vessels, &c.

In 1836, Dr. J. A. C. Schott‡ published a very good summary of the evidences on this subject, concluding in favour of the presence of nerves in the funis. His reasons for this belief I extract from a review of his work in the *Dublin Journal*.§

“ 1. The irritability of any part, it will be admitted, (he says) is in proportion to the nervous power allotted to it. Now, of all arteries, those in the umbilical cord appear to

* Philosophical Transactions, 1825.

† Ueber die Kreislauf des blutes im Kinde. Carlsruhe, 1816.

‡ Die Controverse ueber die Nerven des Nabelstranges und seiner gefässe &c. &c.

§ Vol. x. p. 457.

be the most irritable ; therefore they must be supplied with nerves.

“ 2. Osiander, sen. considered (and Dr. Schott agrees with him,) that the arteries of the cord have in some degree an independent action, founded upon his observing a pulsation in the cord after the heart had ceased to beat. Naegele records a similar fact. But independent action involves necessarily the presence of nerves.

“ 3. The nutrition of any part must essentially depend upon nervous influence. Now the arteries themselves increase with the elongation and augmentation of the cord, and must consequently be thus influenced.”

In addition to the above considerations, Dr. Schott adduces the evidence of pathological conditions of the cord as necessarily involving the existence of nerves.

It would be desirable to possess demonstrative proof of their presence, if possible ; but in the absence of that, I think the arguments from physiology and pathology very conclusive.

The vessels of the cord, with whatever nerves it may be endowed, are imbedded in a quantity of thick serosity, contained in a cellular web, something in the manner of the vitreous humour of the eye. This has been called the *jelly of Wharton*, and upon the amount of this substance depends the thickness of the cord. It is sometimes colourless and transparent, in other cases yellowish or reddish, but without any effect upon the growth of the child.

It is rather more abundant towards the fœtal end of the cord, and the cells in which it is contained, being of various sizes, give the appearance of pouches to different parts of the cord.

When the cord is cut across, a great portion of the serosity escapes, and if care be not taken to secure by a tight liga-

ture the fœtal portion, fatal hemorrhage may be the consequence of this diminution in bulk.*

So much for the ordinary structure of the funis. There are, however, some very curious and important deviations from it, which it may be well to notice briefly.

1. The vessels of the cord may divide at two, three, or four inches from the placenta, or even near the abdominal extremity, instead of being inserted into that organ together.

2. Instead of one vein and two arteries, there have been found two veins and but one artery—one vein and one artery, or three arteries.

3. Two cords have been observed, attached to one placenta, in the case of a single child.

4. The vessels are sometimes partly or wholly closed.

5. Many cases are on record of the entire absence of funis and umbilicus; but upon these Velpeau throws great doubt.

A case of an acephalous fœtus recently occurred at the Western Lying-in Hospital, which had formed adhesions by the back of the neck to the placenta, from which the funis arose, and passing round the right side of the neck, was inserted into the depression between the face and neck, just about the spot where the angle of the jaw should have been, had there been no malformation. The vessels of the cord passed behind the clavicle and ribs, down into the chest and abdomen, and were there lost. There was a depression, or *cul de sac*, about the proper situation of the umbilicus. This is the most remarkable deviation from the usual course of the funis I have ever seen.

Chaussier† relates an instance where the placenta was

* Burns' Principles of Midwifery, 9th ed. p. 228.

† Bulletin de la Faculté, vol. v. p. 313.

attached to the liver, and another is on record in which it adhered to the abdomen.*

6. When the umbilical ring is imperfectly closed, the sheath of the cord sometimes contains a portion of the intestines.†

7. In the case of twins, the placenta and cords are generally distinct; but sometimes a cross branch establishes a communication between the two.

8. The cord may be inserted into a smooth part of the chorion, instead of into the part where the placenta is forming, and the fœtus perish for lack of nourishment.

9. The cord (at an early period) may be so twisted as to diminish the calibre of the vessels, and impair the nutrition of the fœtus.‡

10. The vessels of the cord may become varicose, or the sheath of the cord may contain hydatids.

11. The coats of the vessels may give way, and excessive hemorrhage result.

12. The cord may be torn across by the mother's falling, or receiving a violent concussion.

The external arrangement of the cord may also vary from its ordinary condition.

1. In addition to the false knots, or loops, formed by the vessels of the cord, as already noted, we sometimes find real knots, either single or double.

Baudelocque has given a plate of each,§ and Oslander cases of both.|| Matthias Saxtorph has published upon the subject

* Guillemot, Thèse, No. 120.

† Capuron, Cours d'Accouchemens, p. 130.

‡ Montgomery, Signs of Pregnancy, p. 263.

§ L'Art des Accouchemens, vol. i. p. 255.

|| Abhandlungen und Nachrichten, s. 211.

a very interesting memoir,* in which several cases are related. In one, the fœtus presented with the shoulder, and was turned and delivered successfully. On the cord was found one of these knots (not formed during the turning), which was drawn tight. The vessels were injected with wax, which passed readily through that part of them implicated in the knot. When untied, it still curled into a circular shape, and the inside of the circle was flattened. The calibre of the vessels was somewhat diminished.

A second case was more remarkable. A lady of rank was frightened on returning home from church, and the shock occasioned the evacuation of the *liquor amnii* four weeks before she gave birth to a healthy lively child, upon whose funis was found a *double* knot drawn tight. The motions of the child were not felt after the discharge of the waters. An injection passed through the vessels of the knot, though with rather more difficulty than under ordinary circumstances. Saxtorph considers that the evacuation of the *liquor amnii* saved the life of the child, by lessening the cavity of the uterus, and diminishing the stress upon the knot. Mr. Rogers† remarks that he found these knots no obstacle to the injection of the placenta through the cord.

Judging from the appearance of the knot when untied, there can be little doubt that it is formed at an early period of uterogestation, favoured by the length of the cord, the quantity of *liquor amnii*, and the small size of the child, permitting an extent of motion, impossible afterwards. Undoubtedly, a knot may be formed, as Professor Burns suggests,‡ “by the child passing through a coil of it during labor,” or by a want

* Von der Knoten und Verschlingungen am Nabelstrange lebender Kinder. Gesamm. Schriften, p. 187.

† Lancet, 1829, vol. i. p. 162.

‡ Principles of Midwifery, p. 228.

of due care in turning the child ; but these are not the true knots of which we are now speaking, and when untied, do not assume a circular form.

These knots are spoken of as highly dangerous to the life of the child, if not always fatal. Levret remarks,* “ On trouve quelquefois le cordon ombilical noué d’un vrai nœud ; on en a vu de tortilles en double ; on en a même trouvé, qui étaient entièrement séparés du placenta : quand une de ces trois circonstances arrive, l’enfant périt ordinairement avant terme, ou il naît du moins fort emacié.” And more recent authors have repeated this opinion more or less modified. Baudelocque, Saxtorph, and Gardien differ from them, and state that little or no danger results from this disposition, beyond the varicose state of the vessels on either side of the knot, if it be drawn tight. This position is established by the fact that children are born healthy, who for months have been subjected to all the consequences of such knots.

2. The funis may be coiled round the child’s neck, extremities, or body, in consequence of its excessive length, and the movements of the fœtus *in utero*. If the length of the cord be very great, several coils may be formed. I have quoted from M. Heritier, a case where it was five times round the neck. An artificial coil may be formed during the expulsion of the child, or in turning.

As to the frequency of this occurrence, Richter of Moscow met 27 examples out of 624 cases ;† Siebold, at the Berlin Clinique, 21 out of 137 cases ;‡ and Kluge 63 out of 268.§

* L’art des Accouchemens, sec. 305.

† Synopsis prax. obstetr. p. 417.

‡ Bulletin de Ferussac, vol. xxi. p. 41.

§ Ibid. p. 402.

Dr. Ashwell mentions 30 cases of coiling in 649 cases. I give these on the authority of M. Velpeau, as I have not the documents to refer to. Out of 242 cases, of which notes were taken under my own superintendence, it occurred 63 times. Thus, in 1920 cases, there were 204 examples of coiling, or rather more than one in nine.

As to the *physiology* of the cord ; after the second month, it is merely a sheath containing the vessels of fœtal nutrition, and transmitting the impure blood to the placenta for renovation, and afterwards returning it to the child.

The arrangement is, in one respect at least, analogous to that in the lungs subsequent to birth, viz. the impure blood is conveyed to its destination by arteries, and when renovated is returned by the vein, contrary to what occurs in every other structure of the body. I may repeat, that though we have every reason to suppose that a process, analogous to aeration in the lungs, is carried on in the placenta, yet no similar difference can be observed between the color of the blood in the veins, and that contained in the arteries. The blood in both is of an equally dark color, or nearly so.

Connected with the cord, there are two *medico-legal* questions which I must not pass over.

1. We have already seen that the umbilical insertion of the cord, which, at the earliest period of fœtal life is near to the pubis, gradually recedes from it, and approaches the ensiform cartilage. In the words of Velpeau,* “ Le point du ventre qui donne insertion au cordon ombilical est d’autant plus éloigné de la poitrine ou d’autant plus rapproché du pubis, que la grossesse est moins avancé.” According to the

* *Traité complet, de l’Art des Accouchemens*, ed. de Bruxelles, p. 167.

researches of Chaussier and Bigeschi, this gradual elevation of the umbilicus appeared to have brought it, at the time of birth, to the centre of the whole body. Consequently, any falling short of this point would indicate prematurity; and the test was proposed to be used in those cases where a doubt exists of the completion of pregnancy.

Dr. Montgomery* observes, "The situation of this middle point was first proposed as a test of the age of the fœtus by Chaussier, and his observations have been since confirmed by several others.† From the trials I have made of this test, I attach considerable value to it."

The accuracy of the measurement upon which the test is founded has been lately called in question by M. Moreau, Professor of Midwifery at Paris. He is stated‡ to have measured carefully 500 children born at La Maternité, and to have found out of this number, only four instances of cords inserted exactly in the centre of the whole length of the body. In the remainder the point of insertion fell, on an average, from eight to ten lines below the middle. In a few children born about the sixth or eighth month, the cord was inserted into the middle point.

Though this circumstance may not be adequate to disprove the evidence of high authority in favor of Chaussier's test, it is quite sufficient to throw a doubt upon his facts, and to require additional investigation. I am sorry that as yet I can contribute nothing to the elucidation of the question.

2. In cases of children found dead under suspicious circumstances with knotted cords, it has been supposed that

* Exposition of the Signs and Symptoms of Pregnancy, &c. p. 264.

† Capuron, p. 172. Hutchinson, pp. 6-14. Foderè, vol. ii. p. 149. Burns, p. 114-118. Metzger, by Ballard, p. 168. Beck, ed. 5th, p. 180, et seq.

‡ *Lancette Française*, No. 140, 1837. *Lancet* for Feb. 10, 1838.

they might have been formed after death to conceal infanticide, by throwing the suspicion upon them as the cause of death : and it is a matter of some consequence to ascertain whether they could produce such serious effects, and also how the artificial knots may be distinguished from natural ones.

As far as the evidence of individual cases can go, we have seen reason to disbelieve that any injurious consequences result from these accidental formations, and we have the highest testimony to the same effect. (*Baudelocque. Saxtorph. Osiander. Gardien.*)

Further, it appears possible to come to a pretty accurate conclusion in most cases, as to the ancient or recent formation of the knots. In all such cases, we should carefully examine whether the cord be tight or loose, and whether the vessels on either side be swollen or varicose. The vessels should then be injected without untying the knot, and notice taken of the manner in which the injection passes, whether freely, or with difficulty. The cord may then be untied, and we should observe whether it remains loose, or curls into a circle at the knot, and whether the inside of the circle be flattened.

If the knot be moderately loose, and the vessels on either side varicose ; if the injection pass easily, and the cord curls when untied, and the inside of the circle be flattened, we may conclude that the knot is of old standing, and also that it could not have caused the death of the fœtus.

If, on the other hand, the knot be drawn very tight, so that the injection cannot pass ; if there be no varicose state of the vessels ; no flattening of the inner surface of the knot, and no curling round when untied, the evidence is in favor of the recent formation of the knot, either during the delivery, or subsequently, and more or less against the supposition of its having caused death.

There are several ways in which the cord has been supposed to exert a powerful *influence upon parturition*.

1. It is stated by early writers, and repeated again and again by their successors, that a *short cord* may impede the progress of labor, by retracting the head of the child at the termination of each pain; may cause inversion of the uterus; detach the placenta; or may itself be ruptured; and by some, these consequences are spoken of as if they were of frequent occurrence.

Supposing the cases of extremely short cords, for instance under six inches, to be perfectly correct, it is clear that there would be danger of premature detachment of the placenta, or rupture of the cord; but I do not believe that labor would be retarded, or that the uterus would be inverted.

Again, it is doubtful whether a child could be delivered with a cord only six or seven inches long, unless the labor were premature; so that here we have a similar danger of placental separation and rupture of the funis, with perhaps more risk of inversion.* But the remedy (as in Dr. Hamilton's cases) is within our reach, viz., cutting across the cord after the head is born.

We learn from Dr. Montgomery's cases, that a child may be safely expelled, whose cord measures from 8 to 9 inches; and now, if we consider the frequency of the occurrence of

* Inversion was the more readily attributed to the stress upon a short cord, inasmuch as its occurrence after the birth of the child, was in almost every case supposed to depend upon undue pulling of the cord, for the purpose of removing the placenta; but it has been recently shown by my friend Mr. Radford of Manchester, (*Dublin Journal*, vol. xii. pp. 25—215,) that it may occur without the cord being touched, and that probably many cases have been attributed to this cause which were really instances of spontaneous inversion.

cords shorter than this, we may pretty nearly estimate the amount of danger.*

In 474 cases which I have detailed, there was no cord under 12 inches.

In Siebold's Report of the Berlin Lying-in Hospital, there were none under 13 inches.

If we could estimate the results of the experience of Guillemot, Montault, Meissner, Mauriceau, Baudelocque, Morlanne, Haighton, &c., who have each given one example of a very short cord, and ascertain the proportion of those individual cases to the whole, we should find it very slight indeed.

And further, if we should think it not unfair to take such published reports of hospitals and private practice as are noted for their accuracy, and yet in which there is no mention of a single short cord, (short enough, I mean, to cause accidents,) and add them to the other estimates, and then divide the total by the number of short cords on record; the results would show the extreme rarity of such cases, and more than justify Naegelè's statement, that *the cord is rarely, if ever, so short as to hinder labor, or to entail any serious consequences.*

2. Precisely similar dangers have been attributed to the *coiling of the cord around the child's neck or limbs*, and this because it was fancied that the loss of length by the coil would make the case equivalent to one with a short cord. Had this been true, we should have had many accidents on

* In speaking thus, I am assuming that the case is a head presentation, (as I believe all those referred to were;) if, however, the feet should present, a longer cord will be necessary for the extrication of the infant, as the distance is greater from the navel to the crown of the head, than from the navel to the buttocks.

record, for the coiling is a frequent occurrence. Out of 1271 cases already enumerated, there were 174 examples of this disposition of the cord—or rather more than one in seven ; and without inconvenience or accident. The explanation is quite easy, if such cords be measured ; for it will be found *that this coiling never takes place with a short cord ; very rarely with one of the ordinary length ;* but most generally when the cord is some inches beyond the common standard. I am sorry that I can only refer to my own documents in support of this statement.

Of the 63 cases of coiling (out of 242 patients) noted at the Western Lying-in Hospital, none were under 18 inches long, and only two so short as that ; the most common length was 24 inches. In one funis of 30 inches, and in another of 42 inches, it was twice round the neck. Out of a considerable number in private practice, it never occurred with a cord under 20 inches.

The single coil is a loop extending from the umbilicus round the neck, and back again, and when tight will not occupy more than seven or eight inches, and a second will not require more than five or six inches additional, leaving, of the shortest cord with which the single coil was formed, 10 inches free, and in the cases of double coiling respectively, 16 and 28 inches free.

Thus, taking the shortest cords which were twisted round the neck, we find them equivalent, not to the cases of extremely short cords occurring naturally, but to those of ten inches and upwards ; and we have already seen that from these we cannot anticipate any unpleasant consequences ; for that in Dr. Montgomery's case and others, a funis of eight or nine inches permitted the safe delivery of the child without any interference.

It does not therefore appear to me unwarrantable to conclude

that, as a coil is not formed unless the cord be 18 inches long, or upwards, none of the accidents attributed to it are to be feared; and further, that though it may be desirable to slip the coil over the child's head or shoulders, when possible, to relieve the stress upon it, yet it cannot be a matter of that importance which it is sometimes represented.

Baudelocque* and others have supposed that, if the coil be drawn tight, an arrest of the venous blood returning from the head of the child would be likely to occur, and to end in cerebral congestion, or apoplexy. This may be the case if the tightening take place during labor, in consequence of the cord not descending freely along with the body of the child, though, as the pressure can be relieved the moment the head is born, I should rather doubt whether the serious consequences which he describes actually ensue; but we have positive evidence, that the tightening during intra-uterine life is perfectly innocuous, in the fact related by Professor Busch in his report of the Berlin Lying-in Hospital.† He met with a case where the cord had been twisted so tightly round the neck, that a deep groove was observed at birth; but the accident had not injured the growth or health of the infant.

When referring to Baudelocque's opinion, Velpeau remarks that there are no facts on record which substantiate the supposed danger.

Very recently I met with a case in which the twisting of the cord around the neck probably saved the life of the child. The cord was long, and inserted into the edge of the placenta, which came down to the edge of the os uteri, so that the funis would most likely have prolapsed had not the coiling occupied some of its length.

* *L'Art des Accouchemens*, vol. i. p. 254.

† *British and Foreign Medical Review*, April 1838, p. 579.

3. The cord may be prolapsed either at the commencement or during labor. Though by no means of unfrequent occurrence, its comparative frequency varies very much.

Mad. Boivin* mentions its occurrence 38 times, (25 times before, and 13 during labor,) in 20,517 cases. Twenty-five cases were turned, and in 13 the forceps were used. Twenty-nine children were saved, and seven lost. Two were putrid.

Mad. Lachapelle† met with 23 cases in 15,652; 13 were treated by the forceps; and 10 by turning; 17 were saved, and 6 lost.

M. Baudelocque,‡ out of 17,499 labors, reports 41 cases of prolapsed funis.

Dr. Bland§ gives one case of prolapse in 1897 cases of labor.

Dr. Merriman gives 11 cases in 2,947 labors.||

Dr. Granville, one case in 640 labors.¶

Richter of Moscow,** found 4 in 624, and Mazzoni,†† 18 in 450 cases.

Dr. Clarke,‡‡ in his Report of the Dublin Lying-in Hospital, met with 66 cases of prolapsus of the cord in 10,387 deliveries; but the Doctor does not believe that all the cases of this kind were recorded in the registry. Seventeen children were born alive.

* Memorial, p. 354.

† *Pratique des Accouch.*

‡ *L'Art des Accouchemens.*

§ *Philosophical Transactions*, 1781.

|| *Appendix to Synopsis*, p. 335.

¶ *Report of Westminster Dispensary*, p. 25.

** *Synopsis Prax. Med. Obstet.* p. 416.

†† *Statistica Ostetrica di Santa Maria Nuova di Firenze*, 1833.

‡‡ *Transactions of College of Physicians*, vol. i. p. 398.

Dr. Collins,* in his valuable report of 16,654 cases, occurring in the same hospital between the years 1826 and 1833, states that 97 cases of prolapsed funis occurred, 12 of them in twin cases, (*i. e.* I presume, the cord of one of the twins prolapsed,) 24 children were saved, seven were putrid.

At the Coombe Lying-in Hospital in this city, Mr. Gregory reported in 1830,† that since its commencement in February 1829, 691 patients had been delivered, among which there were seven funis presentations, four of which were lost.

At the Wellesley Dispensary, Dr. Samuel Cusack‡ reported in 1830, five cases of prolapse of the funis in 398 labors, and all appear to have been lost.

In the reports of this institution for the year 1832§ 1833,|| by Dr. Maunsell, there were two cases of prolapse of the funis in 839 labors. No mention is made of the result to the children.

Dr. Beatty reports¶ that six cases of prolapse, out of 1182 labors, occurred at the new Lying-in Hospital, between April, 1834, and August 31st, 1837. Four of the children were lost.

In the Western Lying-in Hospital, Arran-quay, Dublin, between November 1, 1835, and December 31, 1840, there were 1640 women delivered, and 7 cases of prolapsed funis. Five children were lost.

If we add these together, they amount to 92,017 deliveries, and 333 cases of prolapse of the cord—or 1 in every 276 $\frac{2}{3}$.

* A Practical Treatise on Midwifery, p. 342.

† Dublin Hospital Reports, vol. v. p. 572.

‡ Ibid. vol. v. p. 494.

§ Edinburgh Medical and Surgical Journal, No. 117. p. 295.

|| Dublin Journal, vol. v. p. 367.

¶ Ibid. vol. viii. p. 66; vol. xii. p. 273.

It must always be remembered, when speaking of the results of this accident to the child, that in Lying-in Hospitals many of the cases do not seek admission till some time after the occurrence, when the chance of a safe delivery is diminished, and some not until the cord has ceased to pulsate. Twenty-two such cases occurred out of the 73 unfavorable ones Dr. Collins has recorded.*

Many circumstances have been assigned as likely to *cause*, or to *favor* the occurrence of this complication.

1. *Malposition of the child.* Smellie, in his plate of this accident, has represented the child lying across the uterus, with the umbilicus at the upper outlet, and the cord hanging down in the cavity of the pelvis; and Froriep regards this as an exact explanation. After a careful examination of the cases I have seen, and a tolerably extensive investigation into those recorded by authors, I can find few, if any, facts in support of this view, and must therefore attribute the explanation rather to Smellie's ingenuity than to his observation.

2. It would appear that a *small* child, with a *large quantity* of the *liquor amnii*, by allowing the head of the fœtus to move away from the brim of the pelvis during the latter months, will favour the escape of a loop of the funis. (*Boer, Mauriceau.*†)

3. The *sudden rupture* of the membranes, and the *forcible rush* of a large quantity of the *liquor amnii*, may have a similar effect, and especially when aided by an untoward position in the mother. (*Boer. Busch. Capuron. Baudelocque. Gardien.*‡)

* Practical Treatise, p. 346.

† Von Geburten unter welchen die Nabelschnur vorfällt, in L. J. Boer's Works, vol. ii. p. 156.

‡ Traité des Accouchemens, vol. ii. p. 414.

4. It will be favoured by a *presentation of the feet or knees*, as they do not fill up the upper outlet,* and even where the cord does not descend at the commencement of labor, it may before the breech enters the pelvis. M. Naegelè is not correct, however, in stating that it occurs most frequently with footling cases.

5. Naegelè adds, *irregular shape*, or *irregular action of the uterus*, as an occasional cause.

6. *Excessive length* of cord forms undoubtedly an important element; but it requires other conditions also, since in the cases of cords of from 36 to 54 inches long which I have noticed, no prolapse occurred.†

7. I may add from my own observation, that I have found in several cases of prolapse, that the *placenta* was situated *low down* near the cervix uteri, and in some few others, that the *funis* was inserted into the lower edge of the placenta.

There are cases, however, which are not attributable to any of these causes.

I have already mentioned a case in which prolapse was prevented by the coiling of the cord round the neck of the child.

In all cases of prolapsed funis, the child is in the utmost danger from the moment the upper strait of the pelvis is filled by the part of the child descending, in consequence of the pressure upon the cord, just as in footling cases. The effects of this pressure are in proportion to the time it is continued,

* Naegelè, Handbuch der Geburtshülfe, p. 283.

† It might not unfairly be asked, says Naegelè, why prolapse of the cord does not always take place, since the length is sufficient, and its specific gravity greater than the *liquor amnii*? He explains it by referring to the fact, that when the membranes first give way, only that portion of the *liquor amnii* which is anterior to the head escapes, whilst the larger portion and the cord are retained by the tight fitting of the head in the upper strait.—*Handbuch der Geburtshülfe*, pp. 104, 285.

if the cord be not partially shielded from it by its situation. Several explanations of the proximate cause of death have been given; but as they are only hypotheses, I shall omit them.

There are but few cases in which the child escapes safely when the labor is left to the natural powers. In those in which I have seen this happy result, the pelvis was very large, the child of a moderate size, and the pains very violent, so that the second stage of labor occupied but a very short space of time. The same result will obtain in those cases where the cord is shielded from pressure by being lodged in the angle at the junction of the sacrum and ilium. The chances will be still greater, if the patient have borne previously five or six children.

Treatment.—The means to be adopted will depend entirely upon the state of the prolapsed cord. Should it exhibit marks of putrefaction, or be without pulsation, it will be useless to interfere, because hopeless as regards the life of the infant, and the labor may be allowed to terminate naturally.* Capuron† advises us not to interfere at once, even though the cord should pulsate, but rather to wait until the pulsations become feeble. It will certainly be desirable that the *os uteri* should be as much dilated as possible; and if we discover the prolapsed cord before the rupture of the membranes, it will be well to postpone their rupture until that object be effected.

* On this point Dr. Collins remarks, "From such (the opinions of Denman and Burns,) I most respectfully differ, as I cannot see any advantage whatever in permitting the patient to endure the pain and distress of labor for hour after hour, which must be accompanied with some risk, when by lessening the head, we can without the least injury terminate the labor."—*Practical Treatise*, p. 350.

† Cours d'Accouchemens, p. 335.

Various modes of management have been proposed.

1. We are advised to push the cord upwards, beyond the brim of the pelvis, and there to retain it with one or two fingers, until the upper outlet be filled by the descending head.

This would seem easy and certain, but in practice it is not so; for the pains which force down the head, force down the cord also, and besides, there is some risk of displacing the head. This re-position is still more difficult, if any other part than the head present. On the whole, I believe I may say that it rarely succeeds.

2. It has been proposed to return the cord, and to hook it over the limbs of the child. This may also succeed, but it is a very difficult and a somewhat dangerous operation, and I am inclined to agree with Dr. Burns, that "if the hand is to be introduced so far, it is better at once to turn the child."* It is but right to add, that Sir R. Croft succeeded twice in this way.†

3. Various mechanical expedients have been contrived for retaining the cord when replaced. Thus, inclosing the cord in a leather bag, and pushing it beyond the head of the child, was recommended by Mackenzie;‡ attaching the cord to the extremity of a canula, by Ducamp; or of a catheter, by Dudan;§ the reductor, by Aitken; a thin elastic flat rod of steel, by Dr. D. Davis||: and a modification of some of these contrivances was suggested by Champion, Favereau, and Guillon.¶

* Principles of Midwifery, p. 433.

† Merriman's Synopsis, p. 99.

‡ Merriman, p. 99.

§ Revue Med. 1828, vol. iii. p. 502.

|| Elements of Operative Midwifery, 1825, p. 170.

¶ Velpeau, Traité des Accouchemens, p. 342. Ed. Brux.

Dr. Harris, of Philadelphia, returned the cord above the knees in a breech presentation, and the child was saved.*

4. Osiander, Busch, Hogben,† and Hopkins,‡ propose to retain the cord by introducing a piece of sponge after its replacement.

5. Dr. S. Merriman has twice succeeded in saving the infant, not by returning the cord, but by placing it in the angle formed by the junction of the sacrum and ilium, where it is in a great measure shielded from pressure.

6. If we determine to try the preceding plans, or if the advance of the head preclude any attempt at reposition, or, lastly, if the cord come down during labor, we may increase the chances of safety by applying the forceps, and hastening delivery as soon as the head is within reach.§

7. If the patient have had children before, and if the pelvis be roomy, and the soft parts well dilated, perhaps the best chance for the child is in turning, particularly if there should be a mal-presentation.

But as this operation is not without hazard to the mother, we should accurately estimate the favourable or unfavourable probabilities as regards the child, before we attempt it.

Mad. Boivin turned the child in 25 cases, and used the forceps in 13 out of the 38 cases she has recorded; and saved 29 children. Mad. Lachapelle in 23 cases used the forceps 13 times, and version 10; 17 children were saved.

As far as I can learn, all these were head presentations.

* Philadelphia Med. Exam. Jan. 26, 1839.

† Obstetric Studies, 1813, p. 62.

‡ Accouch. Vade Mecum, 1814, p. 193.

§ Siebold's Journal, vol. xvi. part 1, p. 200.

|| Memorial, p. 226.

In one case, Dr. Collins saved the child by returning the cord, and retaining it by the hand in the vagina ; in another, by enclosing it in a linen bag, returning it, and retaining it there by introducing a piece of sponge.

No matter what means are adopted, the mortality, especially in hospital practice, will be very considerable ; thus out of 249 of the cases I have referred to, 155 were lost, and 94 saved.*

Should the delivery have been completed within a short time after the cord has ceased to pulsate, it will be our duty to employ for some time the usual means for resuscitating the child ; so long as the heart beats ever so faintly, there is hope.

So much for the influence of the cord upon parturition.

After the birth of the child, the pulsation in the arteries continues for twelve or fifteen minutes, gradually diminishing in strength as respiration becomes more perfect, until at length it ceases entirely. It is not customary in Great Britain to wait for its cessation, but as soon as respiration is sufficiently established, one or two ligatures are put upon the cord, and it is divided.

On the Continent, however, a different practice prevails. Many writers object to ligatures altogether, on the ground that they may lead to local congestion, or otherwise injure the child, and that they are perfectly unnecessary for the purpose of restraining hemorrhage ; † and we are

* See Mr. Robertson's cases, *Med. Gaz.* Jan. 9, 1836 ; and Mr. Hunt's paper, *Med. Gaz.* Feb. 6, 1836.

† “ Quant à la ligature du cordon qui tient au fœtus, la raison physiologique et l'expérience s'accordent à en prouver non-seulement l'inutilité, lorsque la respiration est bien établie, mais encore le danger, lorsque l'enfant

referred to the habits of animals, in proof of this latter assertion.

That the cord may be left without a ligature, and yet no hemorrhage follow, we have the express testimony of Capuron and others; and I recollect seeing several cases delivered under M. Capuron's superintendence, in which this practice was adopted without inconvenience. But, on the other hand, every practitioner must have met with instances of alarming hemorrhage in consequence of the ligature becoming loose, and as this is the case, it would be extremely rash to incur the risk, when prevention is so easy. I altogether doubt the danger attributed to the ligature, except in those cases in which congestion (from tedious labor, &c.) exists at birth, and then, before applying the ligature, it is always wise to allow a small quantity of blood to escape. As to the lesson supposed to be taught by animals, Dr. L. J. Boer* has well observed that the circumstances are totally different—that a sufficient time is allowed to elapse between the birth of the young animal and its separation from the after-birth—that the separation is generally effected at a distance from the umbilicus—and that the cord is exposed to the cold air, &c.; and Dr. William Hunter's observations give the *coup de grace* to this hazardous practice. “A ligature upon the navel string,” the Doctor remarks in his manuscript lectures (1752,) “is absolutely necessary, otherwise the child will bleed to

est menacé d'apoplexie. S'il est donc essentiel alors de couper le cordon ombilical aussitôt que l'enfant est né, rien ne presse d'en faire la ligature. On pourrait même absolument s'en dispenser dans la suite, si l'on n'avait à craindre qu'un maillot trop serré ou des cris aigus ne vinrent à suspendre la respiration, et à faire jaillir le sang par les extrémités des artères ombilicales.”—*Capuron, Cours des Accouchemens*, p. 246.

* Bemerkungen ueber das unterbindung der Nabelschnur, in vol. 2 p. 148 of his work, “*Natürliche Geburtshülfe und Behandlung*, etc.” See also Froriep's *Handbuch der Geburtshülfe*, p. 360.

death ; and when tied slovenly, or not properly, it will sometimes bleed to an alarming quantity. As we are to take such vast care to secure the navel string, you will naturally ask, how brutes manage in this particular ? I will give you an idea of their method of procedure, by describing what I saw in a little bitch of Dr. Douglas's. The pains came on, the membranes were protruded ; in a pain or two more they burst, and the puppy followed. You cannot imagine with what eagerness the mother lapped up the waters, and then taking hold of the membrane with her teeth, drew out the secundines ; these she devoured also, licking the little puppy as dry as she could. As soon as she had done I took it up, and saw the navel string much bruised and lacerated. However, a second labor coming on, I watched more narrowly, and as soon as the little creature was come into the world, I cut the navel string, and the arteries immediately spouted out profusely. Fearing the poor thing would die, I held it to its mother, who drawing it several times through her mouth, bruised and lacerated it, after which it bled no more. This, I make no doubt, is the practice of other animals."*

The ligature is to be applied about two inches from the body of the child, and drawn very tight. An examination should be made before it is finally covered up, to see if there be any draining, as the escape of the gelatine often slackens the ligature ; if necessary, another should be applied nearer to the abdomen.†

It is customary in these countries to tie the cord a second time nearer the placenta, with a view to prevent hemorrhage, in case there should be a second child, and a vascular communication between the placenta. It is a matter of precaution,

* Merriman's Synopsis, p. 21, note.

† See Mr. Radford's paper in *Edin. Journ.* July, 1832.

not of necessity. It is said by some French authors, that allowing the cord to bleed, facilitates the expulsion of the placenta. I am not prepared to speak decidedly on this point, but I know that it weakens the cord, and unfits it for much traction.

The portion of the cord attached to the abdomen becomes dry, and shrinks from the first or second day, commencing at the outer extremity, and “progressing by degrees towards the navel, until it stops at last at the cutaneous ring at the root of the cord, from which the dried portion soon becomes separated, either by a proper suppuration, or by a spontaneous detachment analogous to that by which the stem of a cucurbitaceous fruit is separated.” “The desiccation of the cord is altogether a physiological phenomenon, belonging to the assemblage of vital phenomena, and entirely dependent upon them.”*

The period of the separation varies a good deal. M. Gardien says that it usually falls off on the 4th or 5th day; M. Orfila, on the 4th, 5th, or 6th day; M. Denis, on the 5th, 6th, 7th, or 8th day; and M. Billard, “that the desiccation is complete towards the 3d day, and it is on the 4th or 5th day that the cord is separated from the abdomen.”

I have kept an account of the period of its decadence in 200 cases, and it occurred as follows :

In	1 case, it fell on the	2d day.
	4 cases, ...	3d ,,
20	...	4th ,,
52	...	5th ,,
81	...	6th ,,

* Billard on Diseases of Infants, translated by Stewart, p. 17, 18. Much minute and valuable information will be found in this chapter.

In 24 cases, it fell on the 7th day.

10	...	8th	„
7	...	9th	„
1	...	10th	„

Thus the 5th and 6th days are the ordinary periods of its detachment.

My friend, Dr. Montgomery, informs me that he has had one persistent until the 15th day, and Dr. Breen has seen one at the 13th day.

When it falls, the umbilicus requires to be protected from friction by a pad of soft rag, smeared with a little simple ointment, or cold cream, otherwise it may be attacked by inflammation, and swelling, and even severe ulceration. This, however, is generally easily subdued by emollient or slightly stimulating applications.

A much more serious matter is the occurrence of hemorrhage, from the cord having been separated or pulled away before the vessels are completely closed. It is extremely difficult to stop the bleeding, and sometimes impossible, without cutting down upon the bleeding artery, and tying it; a most undesirable operation in a young infant. As a striking example of this accident, I shall quote a case related by George Pout, Esq., Market-street, Bedfordshire :

“ On the 4th of September, 1831, I was sent for early in the morning, by a lady of the name of White, requesting my immediate attendance, as her child had been bleeding all night from the navel. On my arrival I found, from the state of the linen, the hemorrhage must have been very considerable, and I endeavoured to ascertain the cause, by introducing a pair of dressing forceps within the navel, as far as possible, and then opening them, to stretch the integuments, but, not being able to see from whence the blood came, I plugged up

the opening with lint, &c., and used pressure, by means of adhesive plaster and a roller.”

In spite of the most judicious treatment the child died, “having bled to death, as the linen clearly proved. This was a full healthy male child, about ten days old. The funis came off as usual, and without the slightest appearance of any thing more than common, on the sixth day. The bleeding commenced on the eighth day, and continued till death. What renders this case most remarkable is, that this lady had lost two children before, under exactly similar circumstances. Upon dissection after death, I found the umbilical vein full of blood, in a fluid state, and nearly as large as a goose quill. Both the umbilical arteries were sufficiently pervious to admit a probe, and the left still containing a plug of coagulated blood, from which it would seem the bleeding took place. They were both so much retracted within the integuments, that it must have been impossible to have stopped the bleeding by pressure.”*

In any similar case, Mr. P. proposes to cut down upon the artery, and to tie it.

Compresses have been recommended, but they are not always useful.

Dr. Stewart and others advise that the navel should be filled with alum, or some astringent, and a compress placed over it.

Escharotics, and even the actual cautery have failed ;† but it has struck me that if the navel were stretched open, and filled with plaster of Paris, either in powder or moistened, it

* Med. Chir. Trans. See also Dr. Stewart's Appendix to his Translation of Billard, p. 547.

† Radford on umbilical hemorrhage, Edin. Jour. vol. xxxviii. p. 4.

might effectually plug the vessels, as it would become solid, and adherent to the skin. I do not know whether this has been tried, but it seems worth the experiment.

I fear that these intractable cases are more frequent than one would suppose. A young friend has informed me that he has met two such, which continued to bleed, in spite of all attempts to plug the navel, and which finally proved fatal.



A REPORT
OF THE
WESTERN LYING-IN HOSPITAL AND DISPENSARY
FOR FIVE YEARS,
Ending the 31st of December, 1840.

The following Report is merely a record of cases observed in extern and intern practice. As much care as was possible has been taken to obtain accuracy, and where there was any doubt, such cases have been rejected. This will account for the discrepancy in the numbers. The present is not the place for lengthened deductions, nor practical directions. I wish the reader to receive the Report for what it is worth, as an addition to our midwifery statistics.

REPORT

OF THE

WESTERN LYING-IN HOSPITAL AND DISPENSARY,

31, AR R A N - Q U A Y, D U B L I N.

The Hospital was established during the latter months of the year 1835, and was in pretty active operation in January, 1836. A minute registry was planned, and executed, as far as possible ; and from this the following facts are extracted.

During the five years, 1705 females have been delivered by the pupils and assistants, of whom 518 were intern, and 1187 extern patients. From this number we must deduct 65 cases of abortion, which will leave 1640 cases of labor at the full time.

The number of children born amounted to 1667, including 25 cases of twins, and one of triplets. Of these there were 933 males, and 716 females, and of 18 the sex is not stated. 123 were still-born, or died soon after birth—of whom

18 were premature.

6 putrid.

1 presented with the head and hand.

14 breech.

10 foot.

5 funis.

5 arm.

12 were crotchet cases.

1 was syphilitic.

3 were the case of triplets.

The ages of 1398 women were ascertained as accurately as possible :

111 were under 20 years.

365 were between 20 and 25 years.

491	...	25	30	...
-----	-----	----	----	-----

225	...	30	35	...
-----	-----	----	----	-----

168	...	35	40	...
-----	-----	----	----	-----

38	...	40	50	...
----	-----	----	----	-----

The entire duration of labor was noted in 1285 cases :

It was under 6 hours in 366 cases.

...	12	...	394	...
-----	----	-----	-----	-----

...	24	...	359	...
-----	----	-----	-----	-----

...	36	...	103	...
-----	----	-----	-----	-----

...	48	...	28	...
-----	----	-----	----	-----

...	60	...	19	...
-----	----	-----	----	-----

...	96	...	14	...
-----	----	-----	----	-----

...	120	...	2	...
-----	-----	-----	---	-----

The interval which elapsed from the commencement of regular labor pains, until the spontaneous rupture of the membranes, was as follows, in 1243 cases :

In 210 cases it was under 2 hours.

335	6	...
-----	-----	-----	---	-----

243	10	...
-----	-----	-----	----	-----

177	14	...
-----	-----	-----	----	-----

102	18	...
-----	-----	-----	----	-----

38	24	...
----	-----	-----	----	-----

46	26	...
----	-----	-----	----	-----

25	30	...
----	-----	-----	----	-----

24	35	...
----	-----	-----	----	-----

13	40	...
----	-----	-----	----	-----

In 14 cases it was under 50 hours.

8	...	...	60	...
3	...	...	70	...
4	...	...	80	...
1	...	...	108	...

Between the rupture of the membranes and the birth of the child, in 1137 cases, there elapsed :

In 610	less than	1 hour.
176	about	2 hours.
136	...	4 ...
86	...	6 ...
35	...	8 ...
23	...	10 ...
30	...	15 ...
13	...	20 ...
9	...	25 ...
4	...	28 ...
2	...	30 ...
6	...	35 ...
5	...	40 ...
1	...	50 ...
1	...	96 ...

Between the birth of the child and the *expulsion* of the placenta, in 1351 cases :

5 minutes	in	352 cases.
10	...	321 ...
15	...	280 ...
20	...	129 ...
25	...	35 ...
30	...	74 ...
35	...	18 ...
40	...	20 ...
45	...	5 ...

	50	minutes in	6	cases.
	60	...	41	...
From .	1	to 2 hours in	38	...
	2	3 ...	18	...
	3	4 ...	6	...
	4	5 ...	6	...
	5	6 ...	1	...
	6	7 ...	1	...

I must observe here, with regard to the duration of labor, and of each of its stages, and of the interval elapsing before the extrusion of the placenta, that in many cases we had no control over it, not being summoned to the patient until the midwife or friends were alarmed at the delay.

I can also state most positively, from careful enquiry, that in no case of delay *during the first stage of labor, did any mischief result to the mother or child which could be in the remotest degree traced to that cause*: on the contrary, *when the second stage was unduly prolonged, assistance of some kind was imperatively called for.*

In 1525 cases, the presentation was as follows:

In 1435 cases the head presented.

16	...	head and hand —	1 died.
35	...	breech,	— 14 died.
22	...	foot,	— 10 died.
9	...	arm,	— 5 died.
7	...	funis,	— 5 died.
1	...	placenta,	— 1 died.

Flooding occurred *before* labor in 4 cases: three were cases of accidental, and one of unavoidable hemorrhage.

Flooding occurred *after* labor in 21 cases—no patient was lost from the hemorrhage, but one died of peritonitis afterwards.

Convulsions occurred in 3 cases—2 recovered.

13 patients were attacked by *puerperal fever*—of whom 4 died.

Turning was necessary in 11 cases—or 1 in 149: three of the children, and all the mothers were saved.

Delivery was effected by the *forceps* in 3 cases—or 1 in 547: one child was putrid, the others were saved. All the women recovered.

Craniotomy was performed in 12 cases—or 1 in 136. One woman only died, and she had been mismanaged; we did not see her until there was no hope.

Of the entire number (1705), 10 women died—or 1 in 170.

1 of these from prolonged second stage (owing to neglect), giving rise to fever.

1 from pulmonary disease, combined with the shock of an operation.

2 from mismanagement of attendants after delivery.

4 from puerperal fever.

1 from apoplectic convulsions.

1 cause unrecorded.

I shall now proceed to relate the principal cases at length.

ELEVEN VERSION CASES.

CASES I. II.

The operation was demanded in both cases in consequence of an arm presenting. In one it was easily performed, but in the other there was considerable delay and difficulty,

in consequence of the vigorous action of the uterus. Both patients recovered, but the children were lost.

CASE III.

Is one of sufficient interest to require a little more detail.

Bridget Connolly, æt. 39, healthy and unmarried, having been formerly delivered by instruments, entered the hospital at the beginning of September, 1836. The pains continued pretty regular for two days, though with rather long intervals, and at the end of that time, although the os uteri was perfectly dilatable, the head remained fixed at the upper strait. A consultation was held with Dr. Darley, and it was deemed expedient to deliver by turning, both because little was to be expected from the natural powers, and because the patient's constitution was beginning to suffer. I succeeded in bringing down a foot, and with great difficulty the child was delivered; from the compressed state of its head, it was evident that the antero-posterior diameter of the upper outlet was under the ordinary standard. It was found necessary afterwards to extract the placenta, in consequence of hemorrhage. The patient was a good deal exhausted at the conclusion of the operation.

She was feverish the next day, and exhibited some symptoms of hysteritis; these, however, subsided under the use of appropriate remedies, and were succeeded by an attack of rheumatism of the left pectoral muscles, and the muscles of the left arm and forearm, to such a degree that she lost the use of this extremity; there was bronchitis also of the left lung, to a considerable extent. Leeches and cupping were employed with benefit, and the attack yielded to repeated small doses of calomel and opium, which affected the gums moderately. After so much suffering, the patient was, as

might be expected, very much exhausted ; in fact, her ultimate recovery could only be looked for as the result of great care. About ten days after her confinement, she was rather incautiously removed to another ward, in which she was scarcely settled when she was seized with a violent attack of peritonitis : the abdomen was universally tender, she suffered acute pain, and effusion shortly took place. The pulse was 120, and very weak ; the tongue dry and brown, and the vital powers depressed to the last degree. Indeed, we all thought that a few hours would terminate her life. The state of her strength (so much reduced by the previous attacks and the requisite treatment,) forbade the employment of bleeding to any extent, and her gums were still tender from the mercury. We applied a few leeches to the abdomen, and afterwards a large blister, which was dressed with mercurial ointment. There remained but one remedy suited to the case, upon which much reliance could be placed, viz.—opium. I accordingly ordered a grain to be given every hour. She took nine grains during the day, with some little benefit, and without headache or narcotism. The second day she took but six, as nausea and vomiting were added to the previous symptoms. In consequence of this, 2 grains of opium, in an enema, were given three times on the third day ; 3 grains, three times on the fourth ; 4 grains, three times on the fifth day—making 42 grains in five days, with none of the usual unpleasant symptoms of an excessive dose of opium.

From the first day some relief was experienced, and this became very marked on the third day. The abdominal tenderness diminished ; the pulse became slower and fuller ; the countenance more natural. On the fifth day, the medicine was omitted, and the convalescence, though slow, was satisfactory.

Her sister, from the country, called at the hospital some weeks afterwards, to say that she was then quite well. I must not omit to state, that the lochia continued to flow in about the natural quantity, uninterrupted by the various attacks.

This case affords another instance, in addition to those published by Drs. Graves and Stokes, of the efficacy of large doses of opium in the latter stages of inflammation, where antiphlogistics cannot be employed. I never knew a worse case recover, and I never saw the effects of any remedy more marked, than were those of the opium in this case.

CASE IV.

An arm presented, with a loop of the umbilical cord. The waters had been discharged an hour and a half before assistance was obtained, and the uterus was acting briskly. Mr. Speedy succeeded, after some time, in extracting the child, which was still-born. The woman recovered well.

CASE V.

Was one of twins. The first child presented naturally, and was born after a short labor. On examining the patient, Mr. Speedy found a second child presenting an arm; he turned it instantly, and succeeded in extracting it *alive*. The operation was facilitated, of course, by the transmission of the first child. Both children, with their mother, did well.

CASE VI.

Was a case of funis presentation, admitted into hospital

June 12, 1837. The waters were discharged about three P.M. and then the prolapsed cord was discovered. On my arrival, at four P.M., I found the funis still pulsating, and as the pelvis appeared sufficiently large, delivery by the feet seemed to afford the child a chance for its life. I succeeded in turning and bringing down the lower extremities and body very readily, but so much time elapsed before the head was disengaged, that the infant was lost. The woman recovered well.

CASES VII. VIII.

These presented so few peculiarities, that I shall not detail them. One of the women had had six children previously, five of whom presented with the hand or arm, and as this was a double arm presentation (she having twins,) it made seven times that she had undergone the operation of turning. She recovered well.

In the other case, the child was saved and the mother recovered.

The remaining cases presented nothing particular—the mothers all recovered.

THREE FORCEPS CASES.

CASE 1.

M. Broderick, æt. 28, was taken in labor of her first child at two P.M. June 28, 1837. The midwife in attendance sent for the assistant surgeon of the hospital to pass the catheter, at five P.M. June 29th. Upon inquiry, he found that the “waters had been discharged at three A.M. of that

day, and that the head shortly afterwards descended into the cavity of the pelvis. A pint of high-colored urine was drawn off, and a purgative enema administered. At nine o'clock in the evening, the head had made no advance, having remained in the same situation for at least twelve hours. The pains had diminished in force and frequency; the patient was a good deal exhausted; her pulse one hundred and twenty and weak, skin hot and dry, tongue white, with great thirst. A consultation was immediately held, and instant delivery resolved upon. As there appeared sufficient space in the pelvis, it was determined to apply the forceps, and in a short time, Mr. Speedy extracted a *living child*, without injury. The placenta was expelled in twenty minutes. Both mother and child recovered well.

CASE II.

Mary Dannelly, æt. 40, was taken in labor of her first child, April 3, 1839. The pains were ineffective for many hours, but they increased the next day, and at 12 P.M. April 4, the waters broke, and the head descended. The pains continued during the night and next day, but did not advance the labor. In the afternoon of April 5, I found her pulse quick, skin hot, tongue dry, &c., and it was evident that there would be danger in delay. I therefore applied the forceps, and delivered her easily, and without injury. The child was putrid. The mother recovered well.

CASE III.

Mrs. —, æt. 40, mother of two children, was delivered by the forceps in her last labor. Labor commenced Feb. 10, 1840, at eight P.M. The waters broke Feb. 11, at five A.M.

and the head descended immediately into the cavity of the pelvis, where it remained immoveable until the evening, when I applied the forceps, and delivered her of a living child. The head was a good deal compressed. I found that it had descended in the *third* position, but owing to the tightness of the pelvis, the usual rotation (into the *second* position) had not been effected, and this, of course, increased the difficulty, by presenting a longer diameter of the head to the antero-posterior diameter of the lower outlet.

The placenta was expelled in five minutes. The mother and child recovered well.

TWELVE CROCHET CASES.

CASE I.

This occurred in Dec. 1835, and the necessity for it arose from a diminution in the fixed diameters of the pelvis. The labor pains had continued thirty-two hours, during the last twelve of which the head remained in the cavity of the pelvis, without any advance ; the pulse at this time was 120 ; tongue dry, with sordes about the teeth and lips ; she was restless and exhausted, and complained of headache ; no tenderness of belly ; yellow discharge from vagina ; no pulsation of fœtal heart.

Having given the utmost trial to the natural powers, it was determined (in consultation with Dr. Darley,) to afford artificial assistance. It was found impossible to introduce a blade of the forceps, and therefore the perforator was

employed without hesitation. I had no difficulty in extracting the child, and the patient recovered without delay.

With regard to the yellow vaginal discharge which occurred in this patient, it is undoubtedly a bad sign (as is usually taught) when it takes place towards the latter stages, accompanied by the symptoms of powerless labor; but it may occur at a much earlier period, and indicate nothing unfavorable. In one case where the head presented, it occurred at the commencement of labor, and after continuing for some hours, it was superseded by the healthy mucous secretion. I need hardly say, that it does not depend upon the discharge of the meconium, but is really a secretion from the mucous membrane of the vagina.

CASE II.

The next case of perforation was also one of narrow pelvis. The patient was admitted into hospital on June 1, 1836, having been for some time previously in labor. The pains recurred regularly for 24 hours, with very little advance of the head of the child, and as the symptoms were assuming a threatening aspect, Mr. Speedy (after consultation with Dr. Maunsell and myself,) delivered her with the crotchet, and without injury. She insisted upon leaving the hospital on the ninth day after delivery.

CASE III.

This was a case of tedious labor; the patient had concealed her state, and retention of urine had taken place with complete arrest of labor pains. All the usual means of exciting uterine action were tried, but she was too far gone when she

entered the hospital, and no chance was left but immediate delivery by the crotchet. It was necessary also to extract the placenta. The patient had a slight attack of hysteritis afterwards, but it quickly yielded to the exhibition of calomel and opium.

CASE IV.

The patient, Mary Corr, æt. 30, had suffered from ill health during the latter months of her pregnancy. We were informed that she was taken in labor on the 7th of April, 1837, and that the pains were slight for two days, but increasing, when they were entirely suspended in consequence of a quarrel with her husband. They returned some time the next day, and on the 12th Mr. Speedy visited her. He found the head presenting, and impacted firmly in the upper strait. The *liquor amnii* had not been discharged; the bowels were constipated, and urine retained. The pulse was quick, and the skin hot and dry. The catheter was passed, and a quart of foetid urine drawn off; a purgative enema was given, and the membranes ruptured. The uterine action increased, and strong pains recurred every five minutes. A consultation was held in the evening, and as all the constitutional symptoms had increased very much, without any advance of the head, it was deemed hazardous to delay the delivery any longer. The head was lessened, and the child extracted in half an hour, followed in a short time by the placenta. The woman recovered without a bad symptom. The history of this case is as indistinct as the early management was faulty, and owing to the same cause, viz.—the stupidity of the female attendants and the drunkenness of her husband.

CASE V.

Mary Byrne, æt. 25, unmarried, in good health, was admitted into the hospital on Sunday evening, June 24, 1837, at 9 P.M. in labor of her first child. The pains had commenced on the previous Friday, and had increased during Saturday and Sunday. On her admission into the hospital, they were frequent, violent, and expulsive. The head of the child occupied the cavity of the pelvis, but was not sensibly advanced by the pains. She was carefully watched for four or five hours, but no progress was made; on the contrary, her pulse became frequent, (from 110 to 120,) her intellect disturbed, skin hot, &c. &c. A consultation was held, and at two A.M. June 25, it was resolved to deliver her by art. The urine was evacuated, and an attempt was made by Mr. Speedy to extract with the forceps, but the force which we felt justified in employing proving ineffectual, craniotomy was performed. The operation was easily completed, and a dose of opium administered. The next day the patient appeared as well as we could expect, and she continued to mend, up to the close of the fifth day. On the sixth day, (July 1,) however, she complained of pain in the abdomen, the skin became hot and dry, pulse 120, and the countenance anxious. Twelve ounces of blood were taken from the arm, and two grains of calomel, with a quarter of a grain of opium, were given every three hours. The abdomen was well fomented. This treatment afforded some relief, but on July the 3d, the symptoms recurred, with the addition of delirium. The head was shaved and blistered, and the medicine continued, but with no good effect. Vomiting of green bile occurred on the 5th, with great prostration of strength, and on the evening of July the 6th she expired.

We obtained permission to examine the abdomen, and we found evidences of universal and most intense peritonitis. In every part, lymph was deposited, the intestines were glued together, and the serous membrane underneath the lymph was very vascular in many parts. The substance and lining membrane of the womb were perfectly free from disease. We could not discover any special cause for the attack ; but the distressed state of the patient's mind would undoubtedly predispose her to disease. She had been the victim of a promise of marriage and desertion.

CASE VI.

Anne Murtagh, *æt.* 28, of a healthy habit, was taken in labor August 28, 1838, of her second child, at an interval of five years from the birth of her first. The pains continued for two days, and on the 31st the head was found partially filling the cavity of the pelvis, but unaffected by the pains. The os uteri was dilated, and the external parts soft. No advance having taken place after waiting some hours, and the pulse becoming very frequent (120,) and the patient restless and feverish, it was deemed advisable to call in Dr. Darley to consultation. After mature investigation, it was found necessary to assist the natural efforts. It was impossible to introduce the blades of the forceps, and we consequently proceeded to perforate the head. We were astonished to see, instead of brain, a very large quantity of water escape ; an explanation was afforded, however, when the extraction was completed, as we then found that the fœtus was hydrocephalic, the head being about twice the usual size. The woman recovered without a bad symptom.

CASE VII.

Mrs. Howard, æt. 24, wife of a private in the Queen's Bays, was taken in labor August 27, 1838. She sent for a midwife, from whom we learned that the waters had been early discharged, and the pains frequent and strong.

She was visited from the hospital on the 28th, and the head was found descending into the pelvis, the pains strong and frequent, and her general state favorable. Labor continued the whole of the 29th, but towards evening the patient became much exhausted, the pulse quickened, the skin hot, and the passages dry. Notwithstanding the frequent and strong pains, no advance had been made for eight or ten hours, and therefore, at seven P.M., with the advice of Dr. Darley, it was decided to deliver her. The forceps was tried, but ineffectually, as the pelvis was narrow and the head impacted. Craniotomy was then performed by Mr. Speedy, and the patient recovered well.

CASE VIII.

Mary Proudfoot, æt. 40, of small stature, was seized with labor, January 30, 1839, at 11 P.M. At 10 A.M. February 1, Mr. Speedy saw her; the waters had been evacuated, but the os uteri was thick, rigid, and undilated; the head presented, and the pulse was quiet. Purgative medicines were given.

At 10 P.M. she was in much the same state, the pains frequent, but not very strong. Tartar emetic was given, with the view of relaxing the cervix uteri.

Feb. 2. Os uteri still rigid and undilated, though the pains were frequent during the night. Feels wearied for want of

sleep ; pulse 100, and strong ; skin rather hot. *Venesection* *ad* $\frac{5}{8}$ xvi.

Feb. 3. The pains improved in strength and frequency after the bleeding, but they prevented sleep, and the patient is consequently much exhausted. The os uteri is but little dilated, so that the head remains above the brim of the pelvis. For the purpose of procuring rest, a full opiate was now given, which obtained two hours' sleep. The pains then recurred, and continued during the day, and she became feverish, with quick pulse, &c. After consultation with Dr. Darley, although from the condition of the patient delivery was very desirable, yet, as it would be very difficult to accomplish it in this stage, it was resolved to wait until morning, unless the unfavorable symptoms should increase. The opiate was repeated.

Feb. 4. The condition of the patient not improved ; pulse 130, with much fever, and but little relaxation of the os uteri, though the pains had wedged the head (covered with the cervix,) into the upper outlet. It was evident that the operation could not be longer delayed without great risk, and therefore Mr. Speedy proceeded at once to perforate the head and extract the child, which was not accomplished without the greatest difficulty. It was necessary to eviscerate the body, as well as empty the cranium. The operation occupied three hours. The child weighed 15lbs. The patient had afterwards a slight attack of peritonitis, which was subdued by the usual remedies, and she ultimately recovered.

CASE IX.

Rose Bentley, æt. 24, taken in labor Feb. 9th, 1839, at 7 A.M. The waters were soon afterwards discharged : the head

was found presenting, and the pains were strong and frequent. About 3 P.M. the head descended into the cavity of the pelvis, and at 7 P.M. had made no further advance, notwithstanding very severe and frequent pains. Pulse 80, but intermitting; neither headache nor fever.

I was sent for at 11 P.M. and found the patient in the condition first described, and, as the general condition was favorable, I did not think it right to interfere, although the head had made no advance for eight or nine hours.

Feb. 10th, 5, A.M. We were summoned to the patient, in consequence of her condition having become worse. The pains had continued strong for some hours after our last visit, but latterly became weaker; the pulse had risen, and there was much constitutional suffering. The head had not advanced, and it was evident that the natural powers were inadequate to the delivery.

I attempted to use the forceps, but found the head so impacted in the pelvis, that the blades of the instrument could not be introduced. This being the case, I at once perforated the head and extracted the child. The woman recovered well.

CASE X.

Mrs. Tully, æt. 20. Labor commenced at 10 A.M., May 4, 1839, and the membranes gave way immediately. The pains continued strong during the day, and in the evening; the head descended into the pelvis. The pains were incessant during the night.

May 5th, 11 A.M. Pulse 100; patient complains of headache; skin hot; some abdominal tenderness; no advance of the fœtal head. The urine was drawn off, and a purgative enema given.

A consultation with Dr. Darley was held in the evening. The labor had made no advance. The patient was in a state of high excitement, with head-ache, quick pulse, and much fever. It was determined to deliver by craniotomy, which Mr. Speedy accomplished with facility. The placenta was afterwards extracted. The woman recovered.

CASE XI.

Eliza Doran, æt. 40. Labor commenced at 9 A.M., October 31, 1839, followed by rupture of the membranes, and suspension of uterine contractions.

November 1st, 11 A.M., the pains recurred strongly and frequently, the head presented, and the condition of the patient was good. The head descended into the pelvis in the afternoon, and then remained stationary.

November 2d, 1 P.M. Very little advance has been made, and the constitution is beginning to suffer ; the pulse is quick, the tongue dry, and the patient restless. A consultation was held, and it was deemed safe to wait a few hours to give a fair trial to the natural powers.

In the night her condition became more unfavorable, and we were again summoned. It was evident that delivery could no longer be delayed with safety. The forceps were applied, but the head could not be moved ; it was therefore perforated, and the child extracted. She was attacked with hysteritis afterwards, but was relieved by the usual means.

CASE XII.

Mary —, æt. 35, was taken in labor on Saturday, Oct. 24, 1840, soon after which the waters broke. They sent to the

hospital at midnight of Sunday, Oct. 25, but gave a false account of the labor, leading the pupil to believe that it had just commenced. On Monday morning, Mr. Speedy visited her, and finding her pulse quick, with great exhaustion, he summoned me.

On my arrival, I found that the pains had nearly ceased ; the pulse was 120, the patient complained of some abdominal tenderness, the tongue was furred, skin hot, &c. The head was at the upper outlet, although the os uteri was fully dilatable.

The condition of the patient was such, that we had clearly no time to lose ; I therefore perforated the head, and gave exit to at least $1\frac{1}{2}$ pints of limpid serum. The child, in fact, was hydrocephalic, which explained its arrest at the upper outlet.

The usual treatment was adopted, but in vain—the patient died that evening. Her death was evidently owing to the fever and exhaustion produced by a prolonged second stage. Had the friends sent sooner, or given a true account when they did send, in all probability her life might have been saved.

PLACENTIA PRÆVIA.

There was one case of *partial placenta presentation*, which illustrates the inefficiency of artificial distinctions. The edge of the placenta reached precisely to the edge of the os uteri ;

when dilatation of the cervix took place, the placenta was necessarily partially detached, and flooding resulted. The case was strictly one of "unavoidable hemorrhage." But the treatment recommended in accidental hemorrhage was quite sufficient, as when the liquor amnii was evacuated, the head descended, and acting as a tourniquet upon the placenta, prevented any further flooding. A similar case, amongst others, I published some years ago in the *Medical Gazette*, and two such are related by my friend Dr. Jameson, in the *Dublin Journal of Medical Science*.

CONVULSIONS.

CASE I.

Apoplectic Convulsions.—Ellen M'Donnell was taken in labor of her fourth child, August 2, 1838, and was delivered at 2 A.M. August 3, after a natural labor of ten hours. Mr. Speedy was sent for a few hours afterwards, and on his arrival he found her in a comatose state, with stertorous breathing, pupils insensible to light, &c. Active antiphlogistic treatment was promptly adopted, but she died during our visit at 1 P.M. of the same day.

CASE II.

The fit came on just as the head began to distend the

perineum. The woman was bled largely, and the paroxysm did not return. She was shortly afterwards delivered of a dead child, and recovered without further accident.

CASE III.

Epileptic Convulsions.—Julia Short, æt. 17, was delivered of her first child, Nov. 20, 1839, after a natural labor of eleven hours. After the expulsion of the placenta, she had a slight convulsion which lasted a few minutes, and then ceased. The fits returned repeatedly in the course of the day, but her friends neglected to send to the hospital, and we consequently did not know it until the pupil who attended her paid his evening visit.

She was immediately visited by Mr. Speedy and myself. We found her insensible, and were informed that the fits returned every half hour, and were evidently epileptic. Her face was flushed, her head hot, with a frequent and full pulse. She was immediately bled largely from the arm, and a purgative bolus and enema ordered. Mr. Speedy visited her at 12 o'clock that night, and, finding that the fits had returned, and that the pulse was still quick, he untied the arm, and took away more blood.

November 21st, 11 A.M. Convulsions continued through the night, though less frequently; pulse quick and full. *Venesection ad* ℥xii.; blister to the head and neck; castor oil draught. During the day, the fits were less violent, and the intervals longer, but the insensibility continued. In the evening, she seemed occasionally conscious, and she swallowed more easily. Ten ounces more blood were taken, with immediate benefit; the fits diminished greatly in violence and frequency, and soon ceased altogether. After this time she recovered rapidly.

PUERPERAL FEVER.

During the spring of 1836, an epidemic of *puerperal fever* prevailed very extensively in this city, and, as usual, spread rapidly, and was very fatal in most of the hospitals. We had a number of extern patients attacked, but scarcely any interns. One or two were threatened, but under appropriate treatment, the symptoms subsided.

ELEVEN CASES

Came under our care ; and it is worthy of notice that ten were cases of hysteritis, and were distinguishable by the absence of general tenderness of the abdomen, and by the swollen uterus, which could be felt, and which was exquisitely painful on pressure. The lochia and milk were sometimes suppressed, and sometimes unaffected. The treatment consisted of bleeding to a moderate amount, blistering, calomel and opium, alone or in combination. Hysteritis, as far as I have been able to observe, is much less fatal than peritonitis. All our patients recovered, except one, who was attacked with peritonitis, and whose friends substituted whiskey punch for the calomel and opium.

CASE XII.

Anne Wilde, æt. 31, was safely delivered of a living child, Nov. 7th, 1837, after a natural labor. The child died afterwards of convulsions. On the third day the mother complained of severe rigors, headache, acute pain in the region of the uterus, cessation of the lochial discharge, vomiting, great heat of skin, thirst, and sleeplessness. Her pulse was 120 and full ;

tongue white and furred. The rapidity with which these symptoms set in was very remarkable ; Mr. Speedy visited her in the evening of the second day, and she was quite free from complaint, and yet the above-mentioned symptoms were all developed on the morning of the third. She was bled to the amount of sixteen ounces ; ordered two grains of calomel, and a quarter of a grain of opium every third hour ; an enema with turpentine and assafœtida immediately, and fomentations to the abdomen every four hours. After this she experienced some relief for a time, and on the pain returning the next day, she was again bled to twelve ounces with benefit. By Dr. Darley's advice, twelve leeches were also applied to the abdomen, and the calomel and opium continued.

Nov. 11th. The symptoms were somewhat mitigated, but the vomiting was troublesome ; the pills, however, were retained ; pulse 120. Ordered to apply a large blister to the abdomen, and to continue the pills.

12th. She appeared to have been relieved by the blister ; the stomach retained some tea ; pulse 100. The pills and turpentine enema were repeated.

This improvement in her state continued till November 14, when the acute pain in the abdomen, from which she at first suffered, returned with great severity, and in her exhausted condition, caused great distress. She was too weak for general bloodletting, but a dozen leeches were applied to the abdomen, without much benefit. The calomel, which had been continued up to this time, had not affected the gums, and none of the remedies which were tried produced more than a temporary relief. She continued to get worse in spite of most careful attention, the pain in the abdomen continued severe, the head became involved, and after a week's further suffering, she died.

Post-mortem Examination.—A large quantity of whey-coloured fluid, mixed with flakes of lymph, filled the peritoneal sac, and a layer of lymph covered the intestines. The peritoneum covering the uterus was highly inflamed. The substance of the uterus exhibited marks of inflammation, and its internal surface had a gangrenous appearance at several points.

CASE XIII.

Mary Dunne, æt. 36, admitted into hospital on Friday, April 23, 1839. Her labor could scarcely be said to have fairly commenced. She had occasional pains for some days, for which opium was given, as they deprived her of rest without dilating the *os uteri*. During this time her mind was anxious and depressed, and her pulse rather quicker than natural.

On Saturday, April 27, true labor-pains came on, and on Sunday morning, at 6 o'clock, she was delivered of a living female infant. Soon after, alarming hemorrhage occurred, and Mr. Speedy was obliged to extract the placenta. The flooding was arrested, but not before it had blanched the patient, and reduced her to an almost lifeless state. By the diligent exhibition of stimulants, reaction was produced, and the patient appeared likely to do well, until Monday evening, when she became slightly delirious, with very quick pulse, but no abdominal tenderness. On Tuesday morning, these symptoms had subsided, but towards evening they returned worse than before. The pulse was very quick; the respiration hurried; the abdomen swollen and tender; and the countenance anxious and collapsed, with delirium, &c. All the most appropriate remedies were tried, but with no effect, and she died on Wednesday, at 10, A.M.

Post-mortem examination twenty hours after death.—A

quantity of serum, with flakes of lymph, was found in the peritoneal sac, and a degree of vascularity of the serous membrane itself. The uterine veins contained purulent matter, but the substance of the uterus was healthy; the right ovary was dropsical; the other viscera were sound.

This poor woman had been very anxious for some time previous to labor, on account of a situation for which she was a candidate, and this may have had an unfavorable effect upon the labor.

UTERINE HYDATIDS.

Ann Curwen, æt. 27, the mother of two children, and generally enjoying good health, menstruated regularly up to the end of August, 1836, the menses ceasing after that time, from pregnancy, as she believed. About a month afterwards, however, she observed a slight discharge from the vagina, resembling blood and water, which continued three months or more, up to December 18th, 1836, when she was attacked with labor pains, and all the signs of abortion, except that instead of an ovum, a large basin-full of hydatids was expelled with considerable hemorrhage. The patient recovered under the ordinary treatment.

ACEPHALOUS FŒTUS.

CASE I.

Mary — was delivered safely of an *acephalous* fœtus, after a natural labor, and was progressing satisfactorily, until

some imprudent person showed the child to her : the shock was very great, she was taken ill immediately, notwithstanding the most active treatment ; she died with symptoms of intestinal inflammation. We could not obtain a '*post mortem*' examination.

CASE II.

Another case of acephalous foetus occurred. The cranium was wanting, the cerebrum being contained in pouches of the dura mater. The foetus had cleft palate also, and double hare-lip. It lived for 12 hours. The mother recovered.

A
CHRONOLOGICAL CATALOGUE
OF
WORKS ON MIDWIFERY.

The following list of obstetric works has been collected from different authors, and from books in my possession. It is not offered as a perfect one, but it may be of use to the student in midwifery.

SECTION I.

ENGLISH MIDWIFERY.

- 1634 Raynalde, J. The Byrth of Mankinde, or the Woman's Boke ; translated from the Latin edition (1532) of Röslin's works, pub. 1502.
- 1634 Ambrose Parè's Works, translated by Johnson.
- 1635 Guillemeau. The Happy Delivery of Women. Trans.
- 1653 The Childbearer's Cabinet.
- 1667 Needham, de formato fœtus. London.
- 1671 Simson, W. The English Midwife.
- 1672 Mauriceau. On Diseases of Women. Translated by Hugh Chamberlen, M.D.
- 1680 Thompson. The Compleat Midwife's Practice enlarged.
- 1698 Peachey, J., M.D. The Compleat Midwife's Practice enlarged.
- 1699 Dampier, W. The Compleat Midwife's Practice enlarged. London.
- 1705 Portal, Paul, M.D. The Complete Practice of Men and Women Midwives. Trans.
- 1716 Deventer, H., M.D. The Art of Midwifery. Trans.
- 1719 Dionis. General Treatise of Midwifery. Trans.
- 1724 The Female Physician.
- 1725 Sharp, Mrs. J. The Complete Midwife's Companion.

- 1725 Maubray, J. Midwifery brought to perfection by Manual Operation. London.
- 1730 Chapman. A Treatise on the Improvement of Midwifery, 2d ed. 1735.
- 1737 ——— Reply to Dr. Douglass.
- 1734 Giffard, W. Cases in Midwifery. Edited by Dr. Hody. London.
- 1736 Dawkes, T. The Midwife rightly instructed, &c. London.
- 1737 Bracken, H. The Midwife's Companion, &c. London.
- 1737 Stone, S. The Complete Practice of Midwifery.
- 1739 Manningham, Sir R. Artis Obstetriciæ Compendium, &c.
- 1742 Ould, Sir F. A Treatise on Midwifery. Dublin.
- 1746 La Motte's Midwifery. Translated by T. Tomkyns.
- 1750 Hill, J. Lucina sine concubitu.
- 1751 Exton, Brudenell, M.D. A new and complete System of Midwifery. London.
- 1751 Burton, J., M.D. An Essay towards a complete new system of Midwifery, theoretical and practical, &c.
- 1753 ——— A Letter to W. Smellie, M.D., &c.
- 1752 Counsell, G. The Art of Midwifery. London.
- 1752 Smellie, W., M.D. A Treatise on the Theory and Practice of Midwifery, with Cases.
- 1754 ——— A set of Anatomical Plates, &c.
- 1755 Watts, G. Reflexions on slow and painful labors, &c.
- 1760 Nihell, Eliz. A Treatise on the Art of Midwifery, &c.
- 1765 Memis, J., M.D. The Midwife's Pocket Companion: Aberdeen.
- 1767 Harvie, J., M.D. Practical Directions, shewing a method of preserving the perineum in childbirth, &c.
- 1769 Johnson, R.W. A New System of Midwifery, &c. 4to.

- 1769 Tolver, A. Present state of Medicine at Paris, with a Theory of the cause and mechanism of Labor.
- 1770 Jebb, Fred., M.D. On the Process of Labor.
- 1772 Gibson, J. Hints and Admonitions on the Practice of Midwifery. London.
- 1772 The Danger and Immodesty of employing Man Midwives. By a Man Midwife.
- 1772 Leake, J., M.D. On the Childbed Fever, &c.
- 1773 ————— Introductory Lecture, &c.
- 1773 White, C. On the Management of Lying-in Women, &c.
————— On Phlegmasia Dolens.
- 1773 The London Practice of Midwifery.
- 1774 Hunter. Anatomia Uteri Humani gravidi, &c. Fol.
- 1779 ————— On Symphyseotomy, in Lond. Med. Obs. and Enquiries.
- 1794 ————— An Anatomical Description of the Gravid Uterus.
- 1776 Rigby, —, M.D. On Uterine Hemorrhage.
- 1776 Hamilton, A. Elements of the Practice of Midwifery, &c.
- 1792 ————— Letter to Dr. Osborn, on certain doctrines, &c. Edinburgh.
- 1777 Moore, W., M.D. Elements of Midwifery.
- 1781 Perfect, W. Cases in Midwifery, 2 vols.
- 1781 Foster, E., M.D. (of Dublin.) The Principles and Practice of Midwifery, &c. Edited by Dr. Sims. London.
- 1783 Osborn, W., M.D. Essay on Laborious Parturition; Essays on the Practice of Midwifery. 2d Ed. 1792.
- 1783 Dease, W. Observations in Midwifery, particularly on the Method of Delivering in difficult labors. Dublin.

- 1784 Aitken, J., M.D. The Principles of Midwifery.
- 1785 Cockell, W. Essay on Retroversion of the Uterus.
London.
- 1785 Douglass, A., M.D. Observations on a case of Ruptured Uterus.
- 1786 ——— A short account of the success of Midwifery in London and Westminster.
- 1786 Denman, T., M.D. An Essay on Natural Labors.
- 1786 ——— An Essay on Præternatural Labors.
- 1787 ——— An Essay on Difficult Labors.
- 1786 ——— Aphorisms on the application and use of the Forceps, &c.
- 1786 ——— An Essay on Uterine Hemorrhages, &c.
- 1786 ——— A Collection of Engravings, to illustrate the generation and parturition of Animals, &c.
- 1787 ——— Introduction to the Practice of Midwifery ; 7th ed. 1832.
- 1810 ——— Observations on Rupture of the Uterus.
- 1787 Spence, D., M.D. System of Midwifery ; 2 vols Edinburgh.
- 1787 Goldson, W. An extraordinary case of lacerated Vagina, &c. London.
- 1789 Grigg, J. Advice to the Female Sex, particularly to those in a state of Pregnancy and Lying-in. London.
- 1790 Baudeloeque. Midwifery. Trans. by J. Heath, M.D.
- 1793 Rawlins, S. A Dissertation on the Obstetric Forceps, &c.
- 1793 Blunt. Man-midwifery Dissected, &c. London.

- 1793 Clarke, J. E., M.D. Practical Essays on the Management of Pregnancy and Labor, &c.
- 1794 Bland, R., M.D. Observations on Human and Comparative Parturition. London.
- 1795 Stephen, M. Domestic Midwifery, &c. London.
- 1797 Mears, Mrs. The Pupil of Nature, or Candid Advice to the Fair Sex.
- 1798 Hull, J., M.D. A Defence of the Cæsarian Operation, &c.
- 1800 ————— Observations on Mr. Simmons' Detection, &c.
- Translation of Baudelocque on Cæsarian Section.
- 1798 Simmons, W. On the Propriety of performing the Cæsarian Section.
- 1799 ————— Detection of the Fallacy of Dr. Hull's Defence, &c.
- 1799 Jackson, S. H. Cautions to Women respecting the state of Pregnancy, the progress of Labor, and Delivery. London.
- 1799 Burns, J., M.D. Anatomy of the Gravid Uterus. Glasgow.
- 1806 ————— Observations on Abortion.
- 1807 ————— Practical Observations on Uterine Hemorrhages. London.
- 1809 ————— The Principles of Midwifery ; 9th Edition ; 1837.
- * 1812 Hogben, J. Obstetric Studies.
- 1812 ————— Anatomical Tables of the Gravid Uterus, &c.
- 1814 Merriman, S., M.D. Synopsis of Difficult Parturition.
- 1815 The Edinburgh Practice of Physic, Surgery, and Midwifery, &c.

- 1816 Kelly, J. M. On the Spontaneous Evolution of the Fœtus. London.
- 1816 Stewart, D. On Uterine Hemorrhage.
- 1817 Black, A. Aphorisms illustrating Natural and Difficult Cases of Accouchement, &c. London.
- 1818 Newenham, W. On Inversion of the Uterus.
- 1818 King, J. On Extra-Uterine Fœtation, &c.
- 1819 Power, J. A Treatise on Midwifery, &c.
- 1819 Granville, A. B., M.D. Report of the Midwifery Practice at the Westminster Dispensary.
- 1819 Douglass, J. C., M.D. On the Spontaneous Evolution of the Fœtus.
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- 1820 Conquest, J. F., M.D. Outlines of Midwifery, &c.
- 1822 Barlow, J. Essays on Surgery and Midwifery, with Practical Observations and Select Cases. London.
- 1824 Blundell, James, M.D. Physical and Posthumous Researches.
- 1834 ————— Principles and Practice of Obstetricy. By Castle. 1840, by Lee and Rogers.
- 1824 McKeever, T., M.D. On Laceration of the Uterus and Vagina. Dublin.
- 1825 Davis, D. D., M.D. Elements of Operative Midwifery.
- 1836 ————— Obstetric Medicine, 2 vols.
- 1826 Hamilton, James, M.D. Outlines of Midwifery.
- 1838 ————— Pract. Obs. in Midwifery, 2 vols.
- 1829 Naegelè, —, M.D. On the Mechanism of Parturition, Translated by E. Rigby, M.D.
- 1831 Ryan, M., M.D. Manual of Midwifery. 3d Ed.
- 1831 Gooch, R., M.D. Lectures on Midwifery. Ed. by Skinner.

- 1831 Waller, C., M.D. Elements of Practical Midwifery.
- 1832 Ramsbotham, J., M.D. Pract. Observations in Midwifery. 2 vols.
- 1833 Campbell, W., M.D. Introduction to Midwifery.
- 1840 ————— On Extra-Uterine Gestation.
- 1833 Ingleby, J. J. On Uterine Hemorrhage.
- 1833 ————— Facts and Cases in Obstetric Medicine.
- 1834 Ashwell, Sam., M.D. On Parturition.
- 1834 Maunsell, H., M.D. The Dublin Practice of Midwifery.
- 1834 Ramsbotham, F.H., M.D. Lectures on Midwifery in the Med. Gazette.
- 1840—1 ————— Atlas of Midwifery.
- 1835 Collins, R., M.D. A Practical Treatise on Midwifery.
- 1836 Reid, J., M.D. A Manual of Practical Midwifery.
- 1837 Rigby, E., M.D. Obstetric Memoranda.
- 1838 Nelson, W., M.D. On Natural and Difficult Labors.
- 1839 Radford, T., M.D. Essays on various subjects connected with Midwifery.
- 1841 Burke, T.T., M.D. The Accoucheur's Vade Mecum.
- 1841 Churchill, F., M.D. Researches on Operative Midwifery.

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- 1815 Bard, Dr. S. A Compendium of the Theory and Practice of Midwifery ; 3d Ed. New York.
- 1816 Kissan, M. D. On the Functions of the Uterus. New York.
- 1819 Dewees, P., M.D. On the means of lessening pain, and facilitating certain cases of difficult parturition. Philadelphia.
- 1824 ————— Essays on various subjects connected with Midwifery.
- 1825 ————— A Compendious System of Midwifery.
- 1824 Horner. Compendious System of Midwifery, &c. Philadelphia.
- 1825 Francis, J. W., M.D. Edition of Denman's Midwifery.
- 1836 Doane, S., M.D. Translation of Maygrier's Midwifery.
- 1836 Meigs, Ch., M.D. Trans. of Velpeau's Midwifery.
- 1838 ————— Philadelphia Practice of Midwifery.
- 1837 James, F., M.D. Edition of Burns' Midwifery.

SECTION III.

FRENCH MIDWIFERY.

- 1573 Parè, Ambrose. De la Generation de l'Homme, &c.
1581 Rousset, F. Traité Nouveau de Hysterotomotokie, &c. Paris.
1587 Touche, Gervais de la. La tres haut et tres souveraine science de l'Art et industrie naturelle d'enfanter, &c. Paris.
1598 Guillemeau. De la Grossesse et de l'Accouchement des Femmes, &c.
1609 Bourgeois, Louise. Obs. div. sur la Sterilité, perte des fruicts, fecondité, accouchemens et mal des femmes, &c.
1626 ————— Instructions à ma fille. Paris.
1611 Fontaine, J. Deux paradoxes, le premier contenant la façon de tirer les enfans du ventre de leur mere, par la violence extraordinaire, &c. Paris.
1639 Pinæus. S. De virginitate notis, gravid. et partu. Leyden.
1650 St. Germain, Ch. Eschole des sages femmes. Paris.
1655 ————— Traité des fausses couches.
1671 Viardel, C. Obs. sur la pratique des Accouchemens.
1676 Bartholinus, M. De insolitiis partus viis human. Havn.
1677 Fournier. L'Accoucheur methodique, &c.

- 1677 Marguerite du Tertre. Instruction familiere et tres facile, &c.
- 1685 Portal, P. La Pratique des Accouchemens.
- 1706 Mauriceau, F. Obs. sur la Grossesse et l'Accouch. des Femmes.
- 1694 ——— Aphorismes touchant la Grossesse, l'Accouchement, &c.
- 1695 Pcu, P. La Pratique des Accouchemens. Paris.
- 1704 Rulcau, J. Traité de l'Operation Cæsarienne, &c. Paris.
- 1708 Hecquet, P. De l'indecence aux hommes d'accoucher les femmes, &c.
- 1713 Armand, Pierre. Nouvelles Observ. sur la pratique des Accouchemens, avec la maniere de se servir d'un nouv. machine tres commode et facile, pour tirer promptement et surement la tête de l'enfant, separée de son corps et restée seule dans la matrice, &c.
- 1718 Dionis. Traité generale des Accouchemens.
- 1721 De la Motte. Traité complet des Accouchemens, &c.
- 1739 Bouvart. Ergo ossa innomin. in grav. et partur. diducuntur. Paris.
- 1743 Mesnard, J. Le Guide des Accoucheurs, &c.
- 1744 Besse, A. Ubi partus diff. ac desperat. tentanda etiam in matre vivâ sectio uteri cæsarea. Paris.
- 1747 Levret. Obs. sur les causes et les accidens des plusieurs Accouch. laborieux, &c. Paris.
- 1751 ——— Suite des Observations, &c.
- 1751 ——— L'Art des Accouchemens, &c.
- 1750 Guenin, S. G. Histoire des deux operations Cæsariennes faites avec succès en 1746 et 1749. Paris.
- 1759 Boursier de Coudray, Mad. Abregé de l'Art des Accouchemens, &c.

- 1759 Puzos, N. *Traité des Accouchemens*, &c.
- 1764 Bertin. *Mem. à consulter sur les naissances tardives*.
Paris.
- 1765 Le Bas. *Nouvelles obs. sur les naissances tardives*.
Paris.
- 1765 Solayres de Renhac. *Elementa artis obstetriciæ*.
Montpelier.
- 1766 Petit, A. *Recueil des pieces relatifs à la question des*
naissances tardives. 2 vols.
- 1769 Raulin, J. *Instructions succinctes sur les Accouche-*
mens, &c.
- 1769 Le Bas. *Pieces de la doctrine sur l'art d'Accoucher*.
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- 1770 Deleurye, F. A. *Traité des Accouchemens*, &c.
- 1772 ————— *La Mere selon l'ordre de la nature*,
&c.
- 1779 ————— *Obs. sur l'operat. Cæsar. a la ligne*
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- 1772 Du Four, J. B. *Diss. de methodo quâdam partus*
præternaturalis speciem in naturalem convertend.
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- 1774 Berdot, Jun. *Abregé de l'art d'Accoucher*, &c. 2 vols.
Basle.
- 1775 Du Fot, A. *Catechisme sur l'art des Accouchemens*.
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- 1775 Eloy, F. J. *Cours elementaire des Accouchemens*,
&c. Montpelier.
- 1775 Barbault. *Cours d'Accouchemens en faveur des etu-*
dians, des sages-femmes et des aspirans à cet art.
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- 1781 ————— L'Art des Accouchemens. 2 vols.
- 1777 Sigault, J. R. An in partu contra naturam sectio symphysium ossium pubis sectione cæsarea promptior et tutior ?
- 1779 ————— Discours sur les avantages de la section de la symphyse, &c.
- 1778 ————— Analyse de trois procès verbaux, &c.
- 1778 Le Roi, A. Recherches hist. et prat. sur la section de la pubis, &c. Paris.
- 1776 ————— La pratique des Accouchemens.
- 1778 Roussel de Vaucesme. Ergo sectio symphyseos ossium pubis admittenda. Paris.
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- 1678 Bamps, H. Tract. de antepionenda sect. cæsar. synchrond. ossium pubis. Paris and Geneva.
- 1778 Examen des facts relatifs à l'operation de la symphyse pratiquè à Arras. Arras.
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- 1779 Sue, P. Jun. Essai historique &c. sur l'art des Accouchemens.
- 1781 Desgranges. Reflexions sur la section de la symphyse de l'os pubis.
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- 1785 Jacob, J. B. *Ecole pratique des Accouchemens.* Paris.
- 1787 Tourette, J. C. E. *De la L'Art des Accouchemens, &c.* 2 vols. Angers.
- 1788 Lauverjat, J. E. *Sur l'operat. cæsarienne, &c.*
- 1792 Noe, J. *Precis de pratique du Manuel des Accouchemens.* Paris.
- 1796 Tap. *Observations sur les Accouchemens precipitès, &c.* Paris.
- 1797 Bodin. *Essai sur les Accouchemens.* Paris.
- 1799 Gaillardot, C. *Sur l'operation cæsarienne.* Strasbourg.
- 1799 Larray, C. F. H. *Reflexions part. sur l'art des Accouchemens.* Nismes.
- 1799 Lambin, J. M. *Manuel des Accouchemens pratiques.* Paris.
- 1800 ? Giraud. *Mon opinion sur les operation cæsar. et de la symphyse.*
- 1800 Demangeon, J. B. *Examen critique de la doctrine, &c. de Saccombe.*
- 1801 Valentin, C. G. *Sur les pertes qui precedent, accompagnent, et suivent l'Accouchement.* Paris.
- 1801 Planchon. *Traité complet de l'operation cæsarienne.* Paris.
- 1801 Saccombe, J. P. *Elemens de la science des Accouchemens.*
- 1803 Flamant, P. R. *Parallele des Accouchemens naturels et non naturels.*
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- 1816 ————— *Mem. pratique sur le forceps.* Strasbourg.

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- 1804 Goubelly, C. A. Connoissances necessaires sur la Grossesse, &c. Paris.
- 1804 Denaux, L. C. Diss. sur la rupture de la Matrice. Paris.
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- 1804 Millot, J. A. Supplement à tous les traitès sur l'art des Accouchemens.
- 1804 Lemonier. Sur l'usage du forceps.
- 1805 Reiss, L. J. Recherches historiques sur le Forceps, &c. Strasburg.
- 1806 Tailhaud, J. B. E. Propositions gen. sur les Accouchemens contre-natures.
- 1807 Gardien, C. M. Traité complet d'Accouchemens. last Ed. 1824.
- 1809 Bezian. Diss. sur les pertes uterines qui arrivent durant la grossesse, pendant et apres l'Accouchement. Paris.
- 1810 Gasc, J. B. Recueil des plusieurs memoires et observations sur divers points de doctrine de l'art et de l'Accouchement. Paris.
- 1811 Dufay, P. Essai sur la theorie et la pratique des Accouchemens. Paris.
- 1811 Capuron, J. Cours theorique et pratique des Accouchemens, &c. Paris.
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- 1815 Maygrier, J. P. Nouv. elemens de la science et de l'art des Accouchemens.

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- 1227 ————— Nouvelles recherches sur l'origine, la nature, et le traitement de la môle vésiculaire, &c.
- 1828 ————— Recherches sur une des causes les plus fréquentes et la moins connue de l'avortement, &c.
- 1829 ————— Obs. et reflex. sur les cas de l'absorption du placenta.
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- 1822 Levasseur. Sur la symphyseotomie, &c. Brussels.
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- 1604 Mercurio, Scipio. La commare raccogliatrice.
- 1721 Melli. La commare levatrice instruita, &c. Venice.
- 1758 Embryulcia de, seu fœtus vivi extractione per uncus non illicita ? Verona.
- 1760 Vespa, G. Trattato della arte ostetricia. Florence.
- 1767 Du Valli. Trattato del parto naturale, &c.
- 1768 Tanaron, P. P. L'Ostetricia, ovvero l'arte di raccogliere i parti, &c. Florence.
- 1770 Tranquillini, G. Dottrina della commare, &c. Verona.
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- 1819 Gutanelli. Storia ragionata d'una gravidanza della tuba fallopiana destra. Pisa.
- 1819 Galbiati, G. Operazioni del taglio della sinfisi del pube. Napoli.
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- 1734 Lopez, F. B. G. Reflexiones contra la dissertacion de la operacion del parto Cæsareo de M. Zapata. Madrid.
- 1781 Garcia. Ueber die trennung der Schaambeine in schweren Geburten. Trans. Madrid.
- 1785 Vidart, V. El discipulo instrudo en el parte de partear, &c. Madrid.
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- 1590 Pape. *Nöthiger bericht von schwängern und gebär. Frauen.*
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- 1658 Hebammen und Hebammenkunst. Gotha.
- 1664 Unterricht für hebammen von stadt-und-land medicin zu Cobourg.
- 1680 Franck. *Diss. de partu difficili.* Heidelberg.
- 1700 Cobourgischer Wehemütter.
- 1701 Die Sachsiche Wehemütter. Frankfort.
- 1703 Metzlicher Cobourgisher Unterricht für die Hebammen.
- 1705 Eckhardt. *Die unvorsichtige Hebammen.*
- 1722 Hebammen Catechismus Strasbourg.
- 1723 Fischer. *De officio obstetricis.* Erfurt.
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- 1731 Kornmann, J. M. *Höchst nöthige Unterricht von der Geburt des Menschen.* Erfort.
- 1726 Behling, J. F. *De rupto in partu utero.* Altdorf.
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- 1740 Deisch, J. A. *De necessariâ in partu præternaturali instrumentorum applicatione.*
- 1754 ————— *Abhandlung dass weder durch wendung nach Zange die scharfen instrum. ganzlich vermieden werden können.*
- 1759 ————— *De usu cultrorum atque unciorum scindentium, &c.*
- 1745 Müller, J. J. *De rupto in partu utero.* Basle.
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- 1750 Lanke, J. G. *Comment. de forcepe ac forcee, &c.*
- 1752 Fatio, J. *Helvetisch vernünftige Wehemutter oder gründliche Unterricht, &c.* Basle.
- 1753 Bossel, C.D. *Grundlegung zu Hebammenkunst vor die Wehmütter, &c.*
- 1753 Røederer, J. G. *Elementa artis obstetriciæ, &c.* Göttingen.
- 1754 Mittelhäuser, J. D. *Praktische Abhandlung vom Accouchiren, &c.* Leipzig.
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- 1758 Chausepiè, P. D. de. *Neue Hebammenwegweiser, &c.* Lubeck.
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- 1761 Henckel. *Abhandlungen von der Geburtshnlfe.* Berlin.
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- 1765 Anfangsgründe der Hebammenkunst. Lemgo.

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- 1772 Didelott. Unterricht für Hebammen, &c.
- 1773 Dufark, J. F. P. H. Diss de partu difficili.
- 1773 Ehrhard, J. Sammlung von beobachtungen zur Geburtshülfe.
- 1774 Camper, P. De emolumentis synchondroseos ossium pubis in partu difficili.
- 1777 ————— Betrachtung über einige Gegenstände der Geburtshülfe, &c.
- 1774 Bang, J. De meehanismo partus perfect. Hafn.
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- 1774 ————— Lehrbuch von der unvermeidl. gebrauche der Instrumente, &c.
- 1775 Guerard, B. Anfangsgründe der Geburtshülfe, &c.
- 1778 ————— Exposé d'un cas dans lequel la section du symphyse des os pubis fût faite a Dusseldorf. Dusseld.
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- 1778 Flemming, J. G. Unterricht für angeh. Hebammen.
- 1779 Engelhard, J. F. De partu difficili et præternatural.
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- 1803 ————— Lehrbuch der theoretische Entbin-
dungskunde, 2 vols.
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- 1815 Lehrbuch den Geburtshülfe zum Unterricht für die
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- 1818 Wenzel, A. J. Allgemeine Geburtshülfl. Betrach-
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- 1818 Eisenhuth, W. Die kunst, leicht und glücklich zu
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- 1823 ————— Das gebarende weib, &c.
- 1820 Reisinger, F. Die künstliche Frühgebürt, &c. Augs-
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- 1820 Schmitt, J. B. Gesam. obstetrische Schriften, &c. Vienna.
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- 1820 Bjoernsen, J. F. Diss. de partu clunibus præviis. Kiliae.
- 1820 Carus, C. G. Lehrbuch der Gynæcologie, &c. 2 vols.
- 1822 ————— Zu Lehre von Schwangerschaft, &c. Abhandlungen, &c.
- 1822 D'Outrepoint, J. Abhandlung und Berträge geburtshülfflichen Inhalts. Würzburg.
- 1822 Lederer, H. Handbuch der Hebammenkunst. Würzb.
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- 1822 Hahn, Ueber Nachgeburtszögerungen. Würzburg.
- 1823 Gergens, F. Die Steissgeburt. Würzburg.
- 1823 Alther, D. Über die Geburtshülffliche Untersuchung. Würzburg.
- 1823 Bleeck, J. C. Diss. de fœtus in caput versione. Kiliae.
- 1825 Schweighaeuser, J. F. Das gebaren nach der beobachteten natur, &c.
- 1826 Gorj, J. J. Über die Wykungsart und Anwendungen der Geburtzange. Würzburg.
- 1826 Deutsch, C. F. Diss. de versione fœtus in pedes.
- 1827 Davidsohn, J. S. Sectionis Cæsar. historia.
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- 1828 Benedik, G. D. De partu Agrippinà. Berlin.
- 1830 Busch, D. W. H. Lehrbuch der Geburtskunde, &c. Marburg.
- 1831 Löwenstein, A. S. Der theoret. und prakt. Geburtshelfer, &c. Glogau.
- 1831 Cohnstein, W. Handbuch der Geburtshülfe, &c. Glogau.
- 1834 Kilian, H. F. Die Operative Geburtshülfe, 3 vols. Bonn.
- 1835 Rosshirt, E. Die Anzeigen zu den Geburtshülfflichen Operationen. Erlangen.
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SECTION VII.

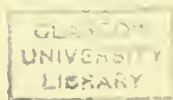
DUTCH MIDWIFERY.

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- 1673 Solingin, C. v. Embryulcia vera, &c. Gravenh.
- 1681 Jansi, S. Korte in bondige Verhandeling, &c. Rotterdam.
- 1685 Free. Diss. de partu difficili. Leyden.
- 1696 Deventer. Dagerrat der Vroedvrouwen, &c. Leyden.
- 1701 ——— Manual Operatien.
- 1701 ——— Operationum chirurgicarum novum lumen, &c.
- 1697 Hoorn, J. von. Siphra och Pua eller handbok för barmosker. Stockholm.
- 1704 Frike, P. Medicus obstetricans. Utrecht.
- 1725 Ruysch, F. Ontleedkundige verhandeligen, &c. Amsterdam.
- 1733 Denis, J. Verhandeling over het Ampt der Vroedmeisters, &c.
- 1733 De Bree, J. Verhandeling soer het Gebruik van der Roonhuyziaanschen Hefbohm in der Verloskunde. Amsterdam.

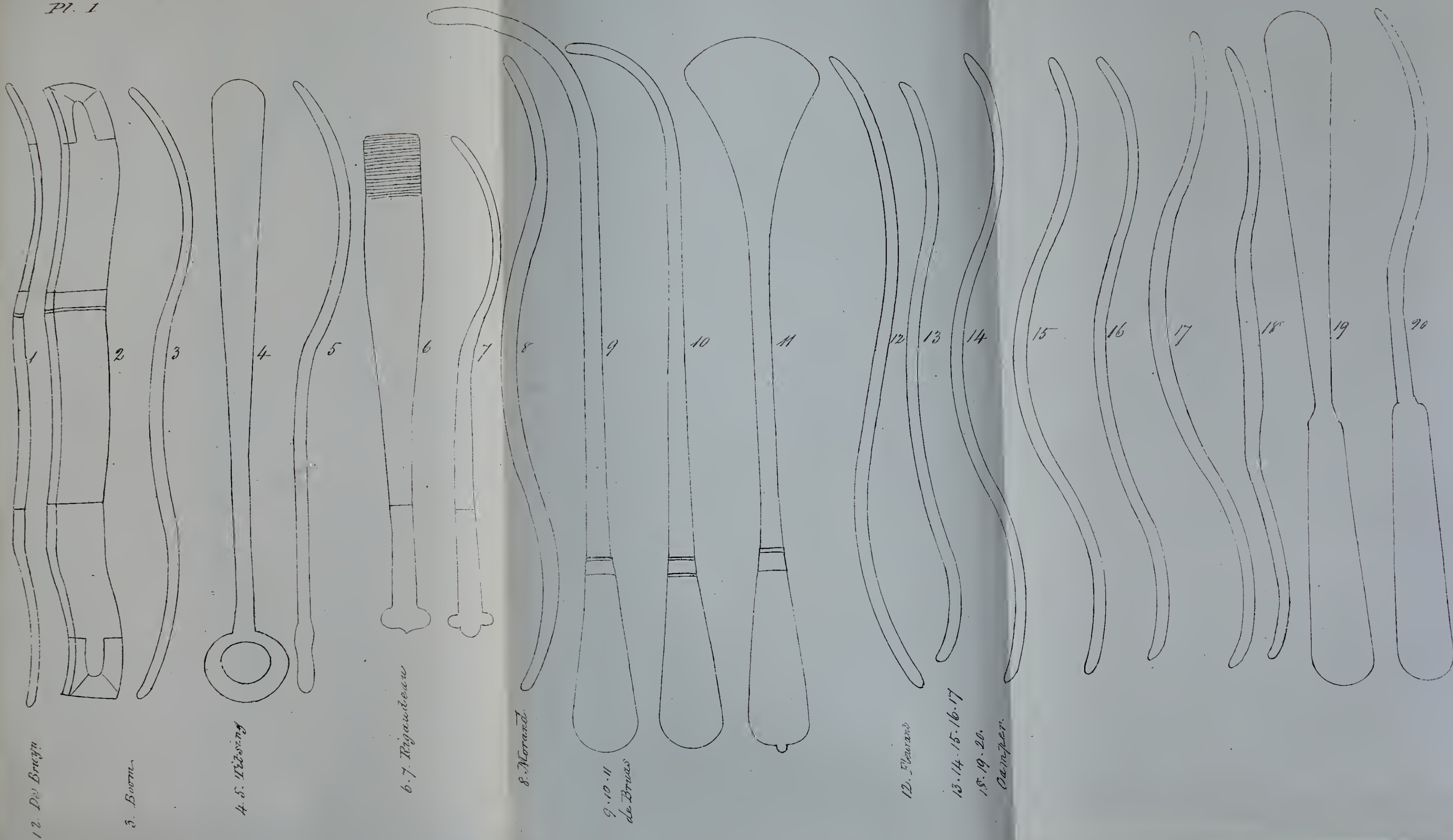
- 1747 Embryulcia nova detecta, of eena heel nieuw en onbekende, dog nuttriga Behandeling in de meeste moeilclyke Baaringen, &c. Amsterdam.
- 1747 Schlichting, J. D. Embryulcia nova detecta, &c. Amsterdam.
- 1747 Rathlauw. Het berugt geheim in der Vroedkunde, &c.
- 1750 Titsing, A. Diana ontdeckende het geheim, &c. Amsterdam.
- 1751 Plevier, C. De gezuiverde Vroedkonst. Amsterdam.
- 1754 Visscher and Van de Poll. Het Roonhuysiansch in de Vroedkunde, &c.
- 1754 Willoughby, C. Vroedkundige Aanmerkingen. Leyden.
- 1754 Wind, P. de, T'geklend Hoofd geredt door, &c. Middelberg.
- 1755 Otuwe, J. Onderwiss der Vrouwen, &c. Haarlem.
- 1755 Bruas, J. H. de. Het gebruik des lepels herstellt, &c.
- 1774 Koedik, L. E. Verhandeling van de Sectio Cæsarea, &c. Utrecht.
- 1782 Kraak, J. Handbok för barnmorskor. Stockholm.
- 1783 Sleurs, P. W. Vroed in werkingkundige proofnemingen, &c. Utrecht.
- 1784 Jacob. Vroedeondige Oeffenshoed. Ghent.
- 1793 Snips, F. Vroedkundige Aamerkingen, &c.
- 1795 Een an jonge Froens van eene ohle Bamoder. Hamburgh.
- 1796 Kock, P. St. Verhandeling over het gevaar en verbeetering de algemeene Handelwyn in de Voetbaaring, &c.
- 1806 Van Wy, G. I. Uetvoerlykheit en Nuttigkeit der Schaambeendoorsnyding, &c.

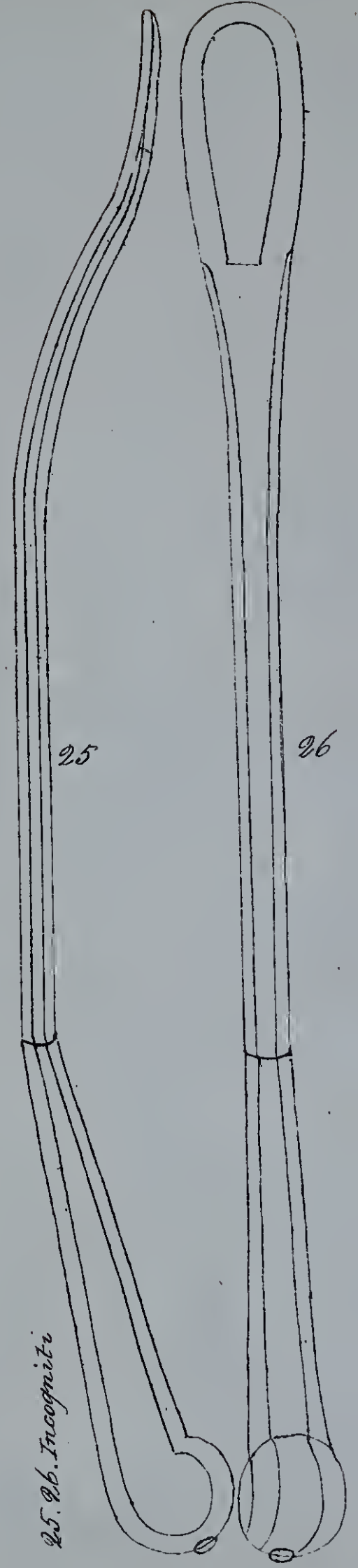
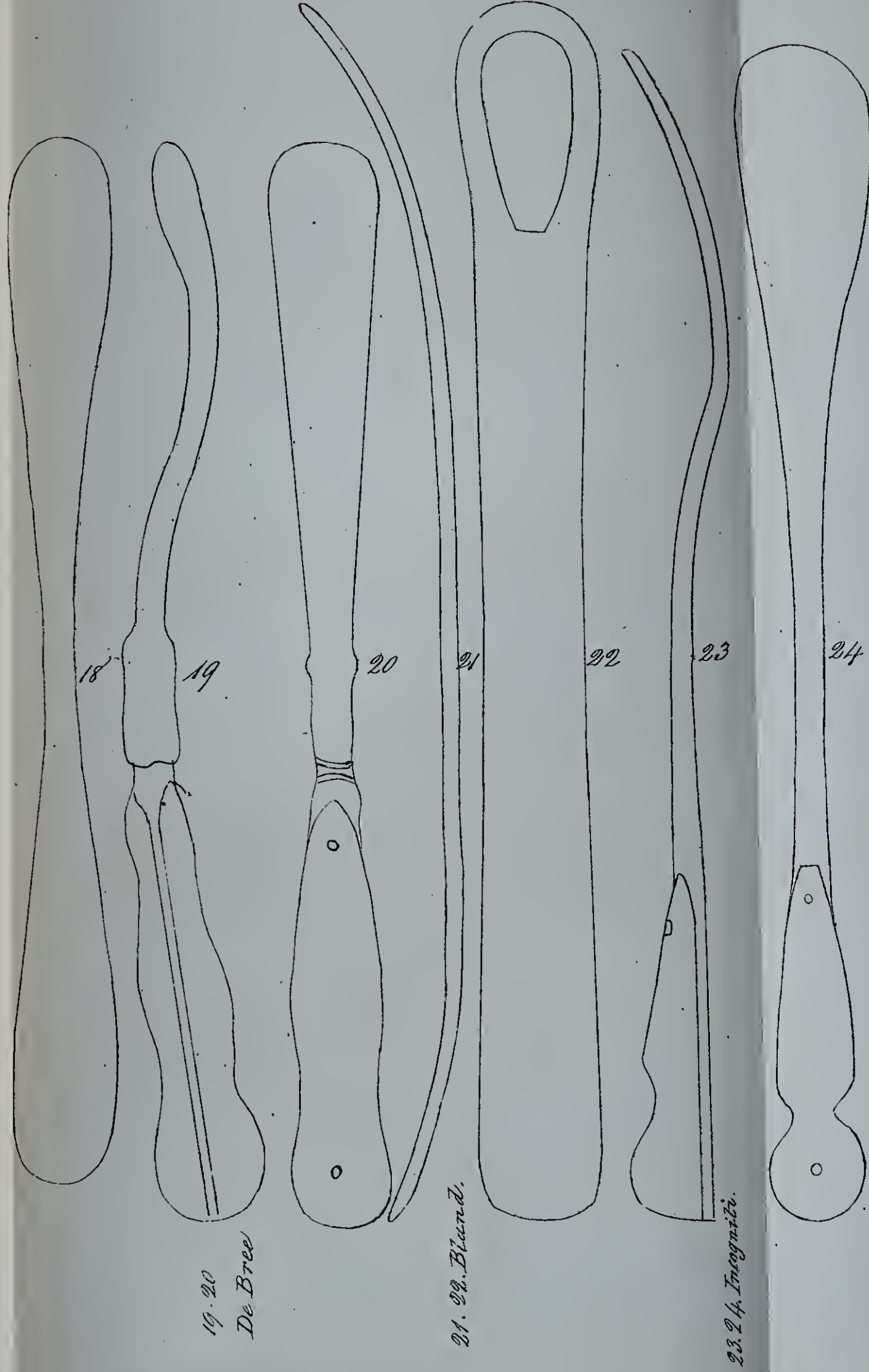
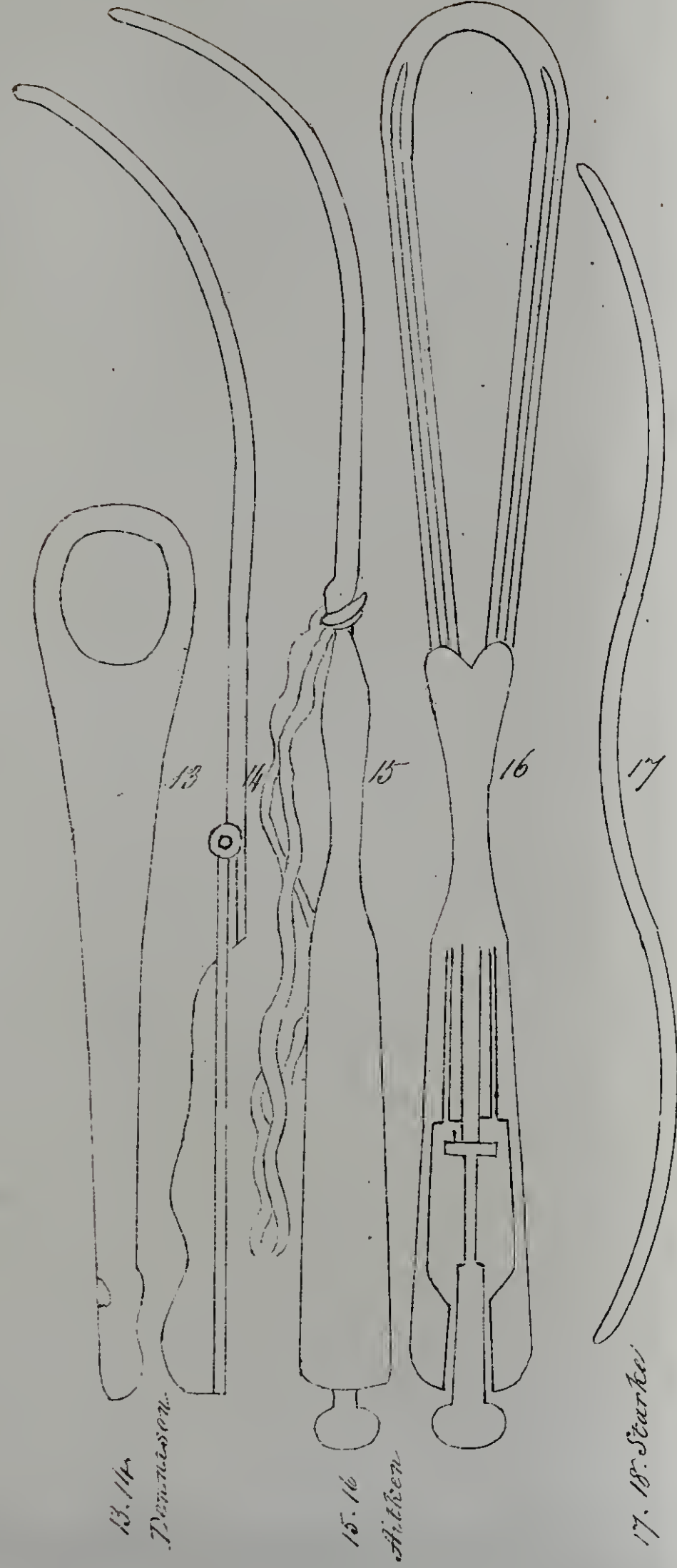
- 1808 Rees, W. van. Katechismus der Verloskunde, &c.
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- 1809 Salomon, G. Over de nuttigheid der Schaambeens-
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- Handleiding tot de Verloskunde.
- 1824 Koning, J. de. Verloskundige Aanmerkingen.

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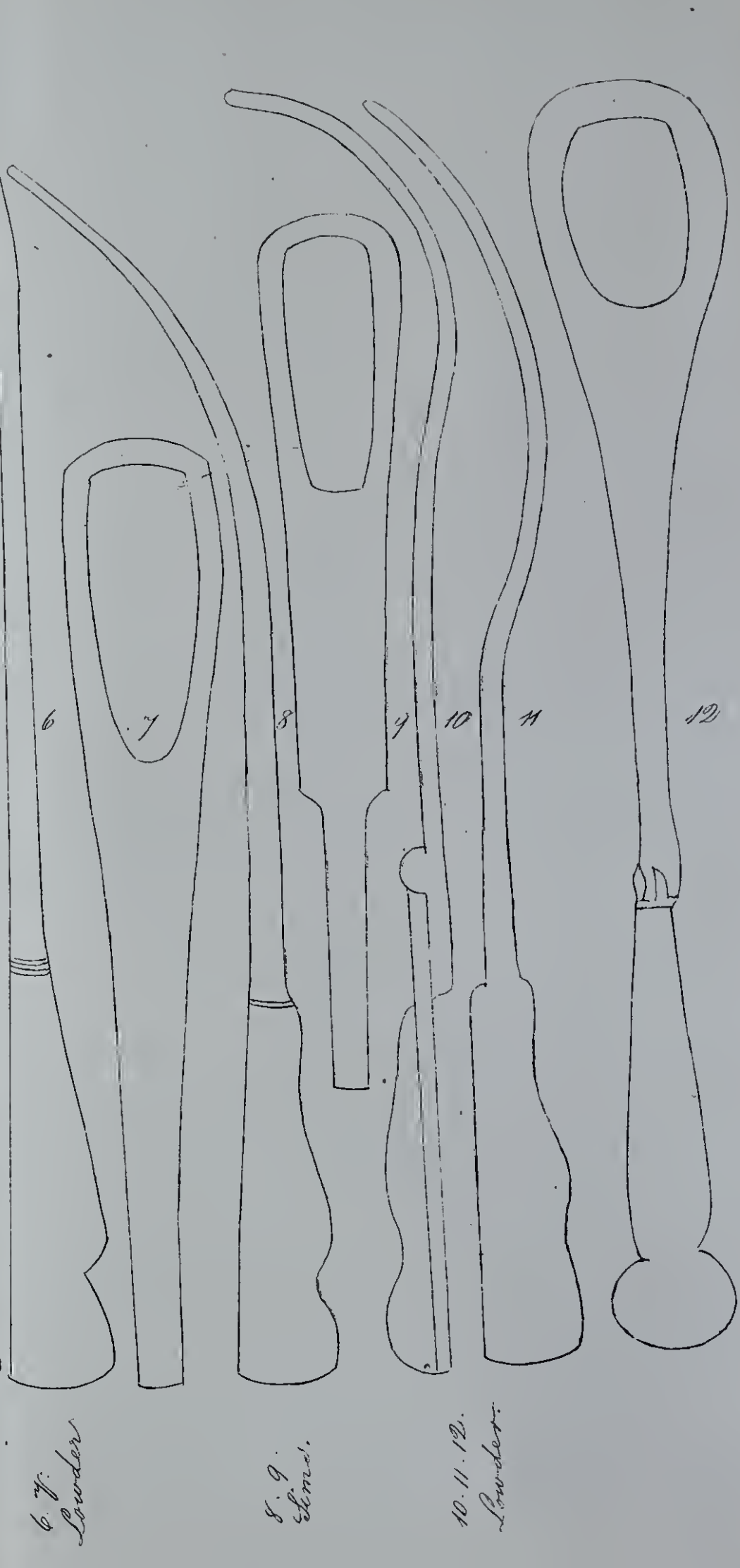
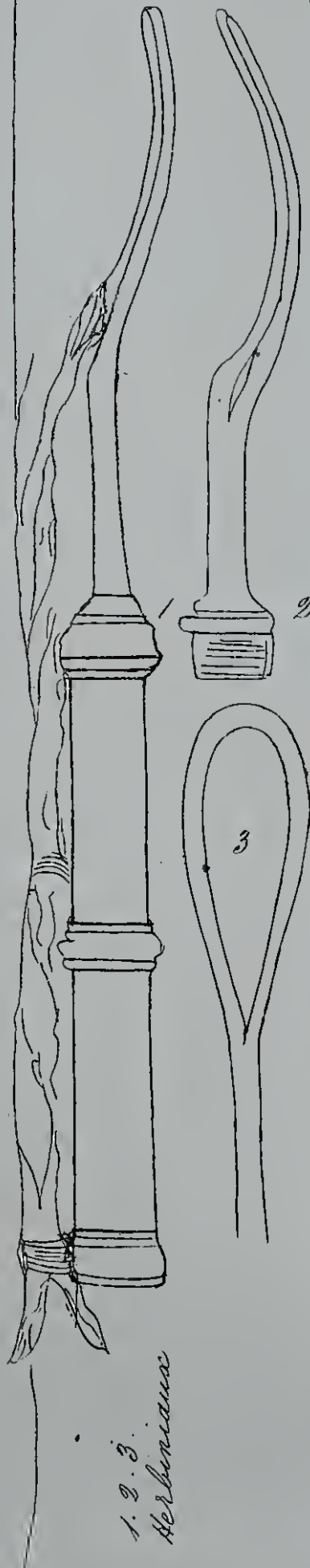
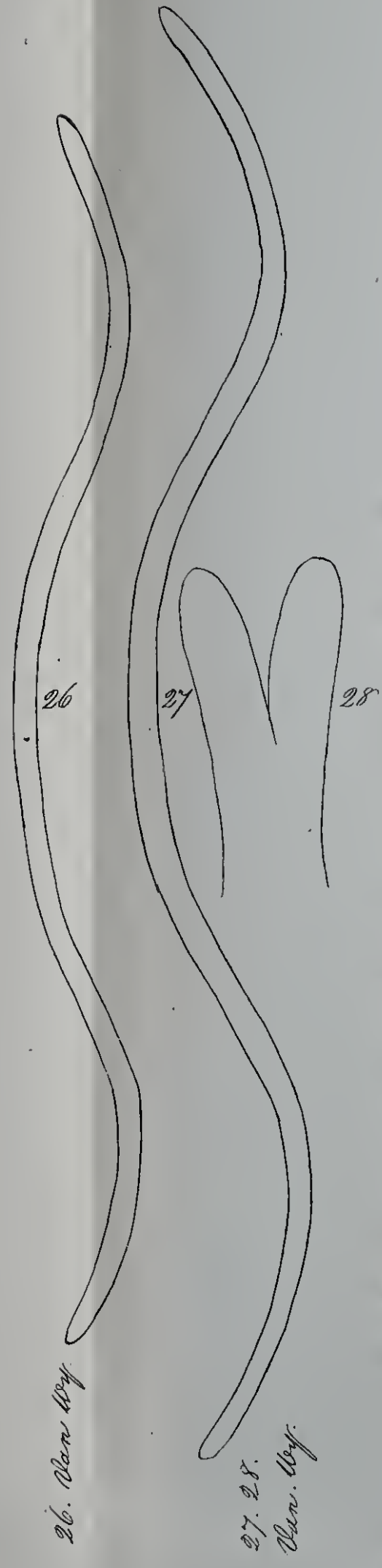
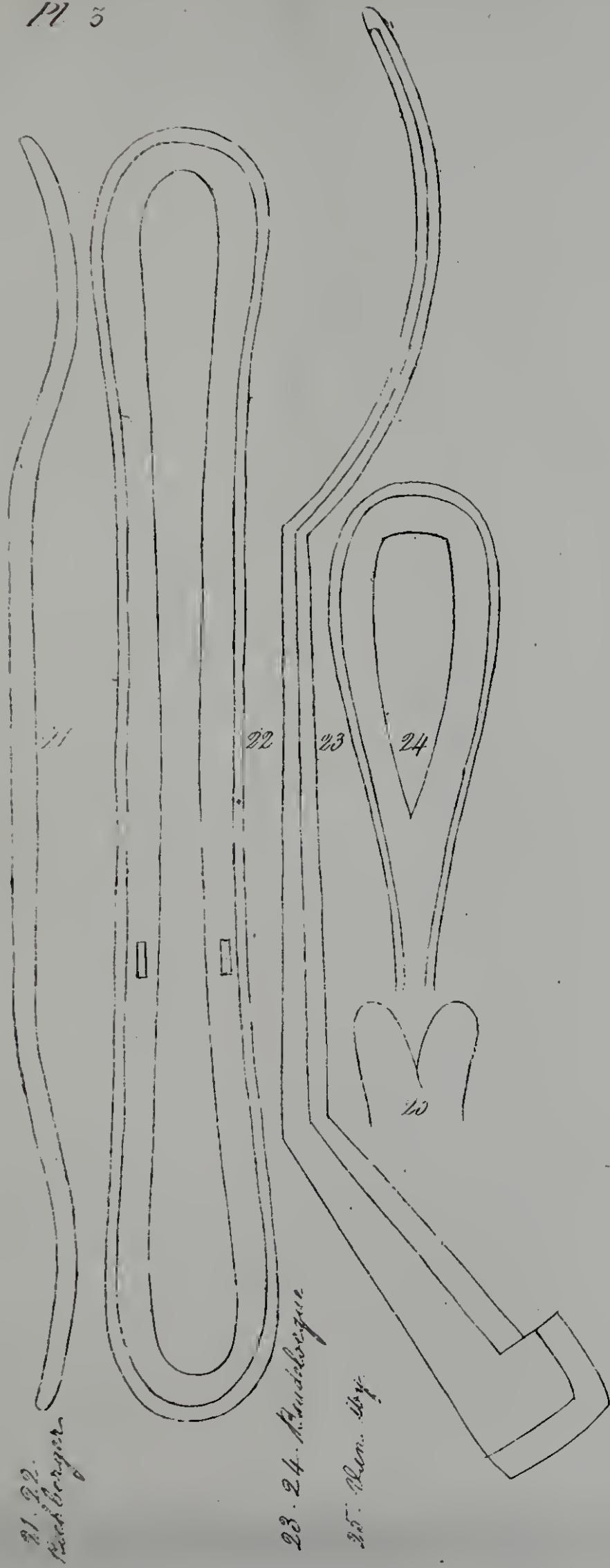


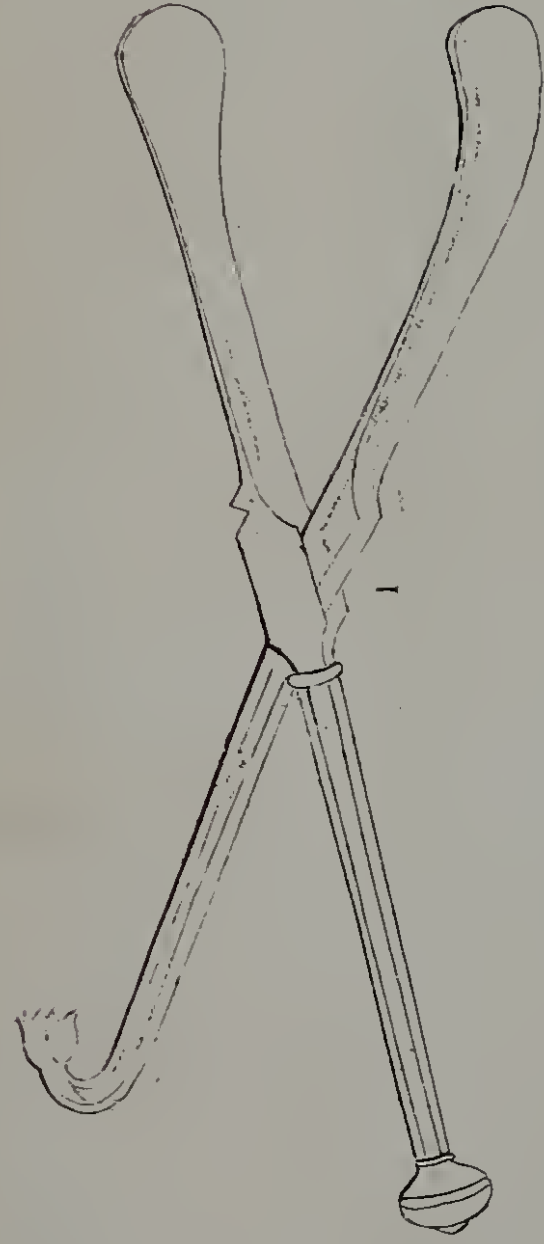
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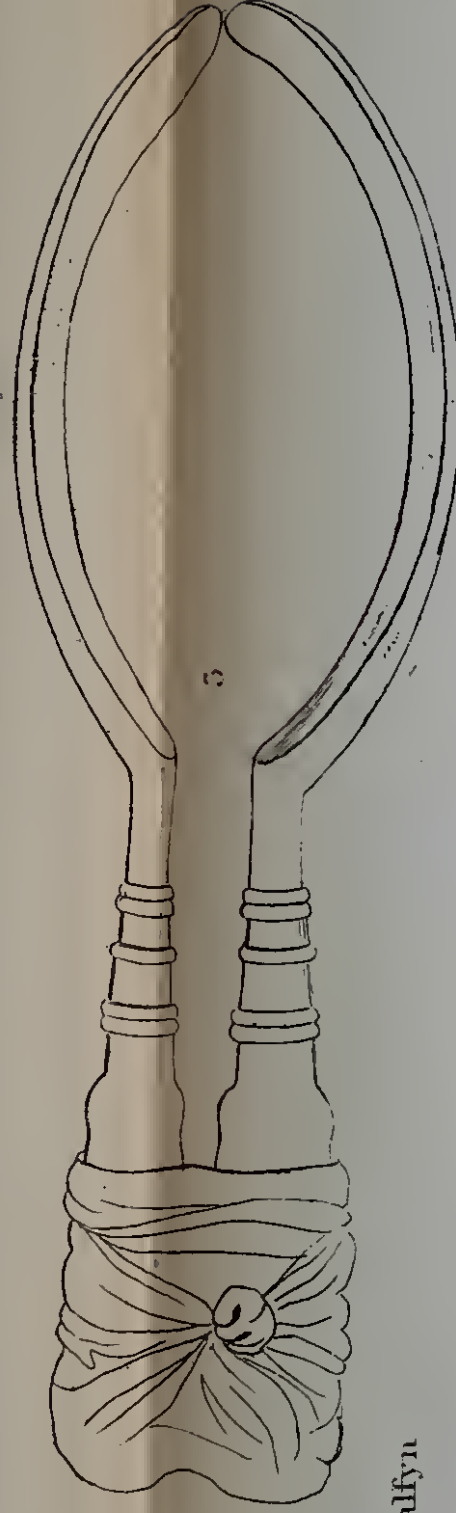
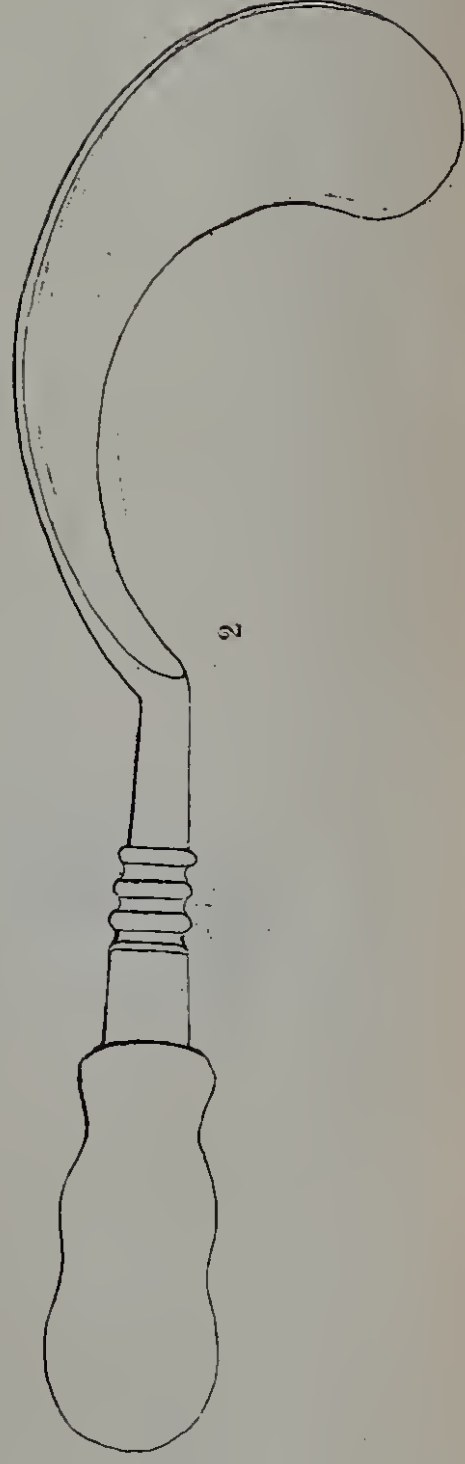




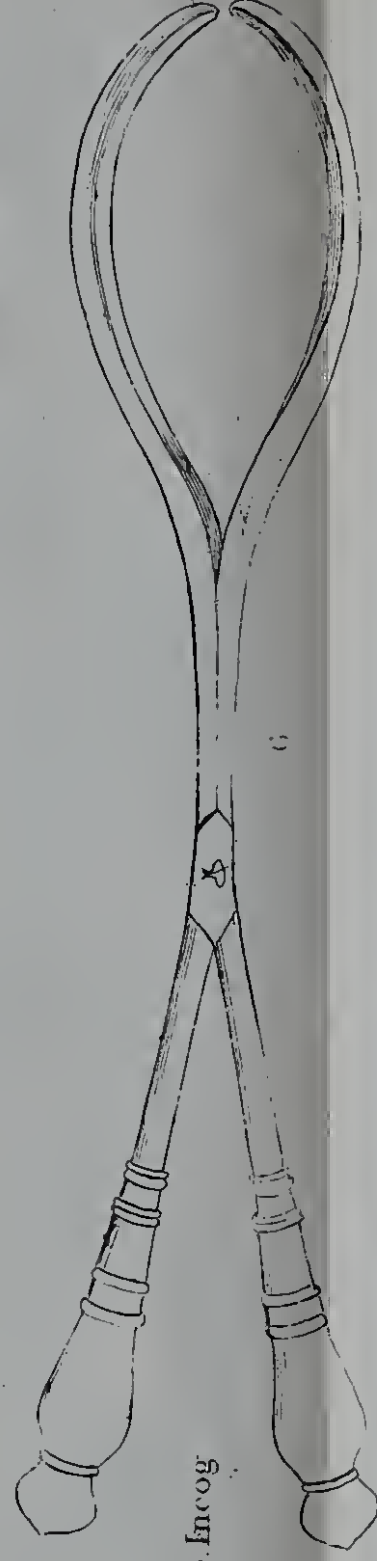
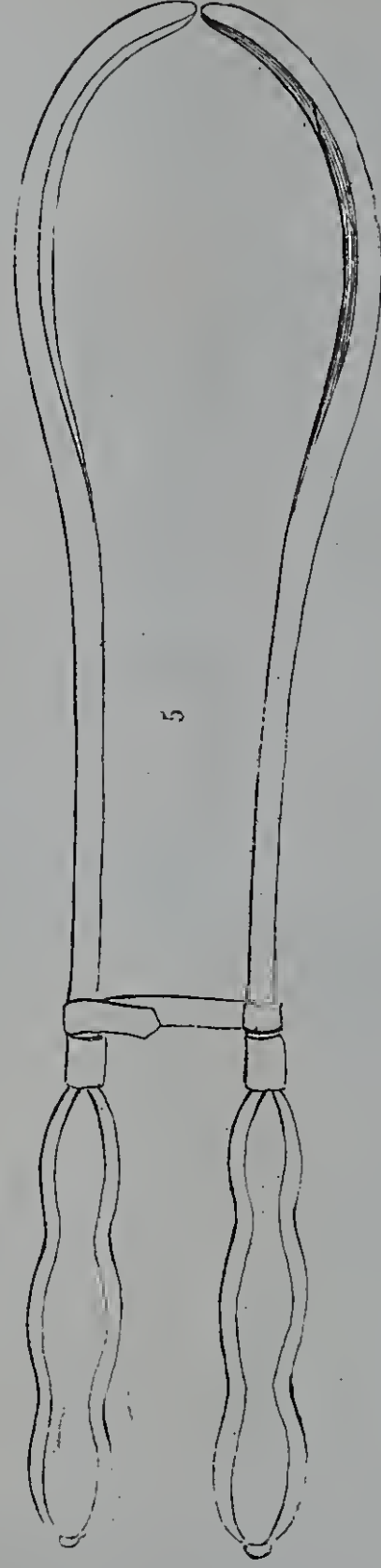
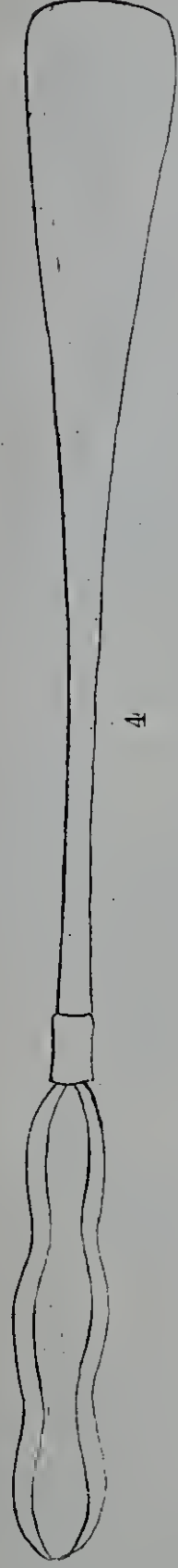




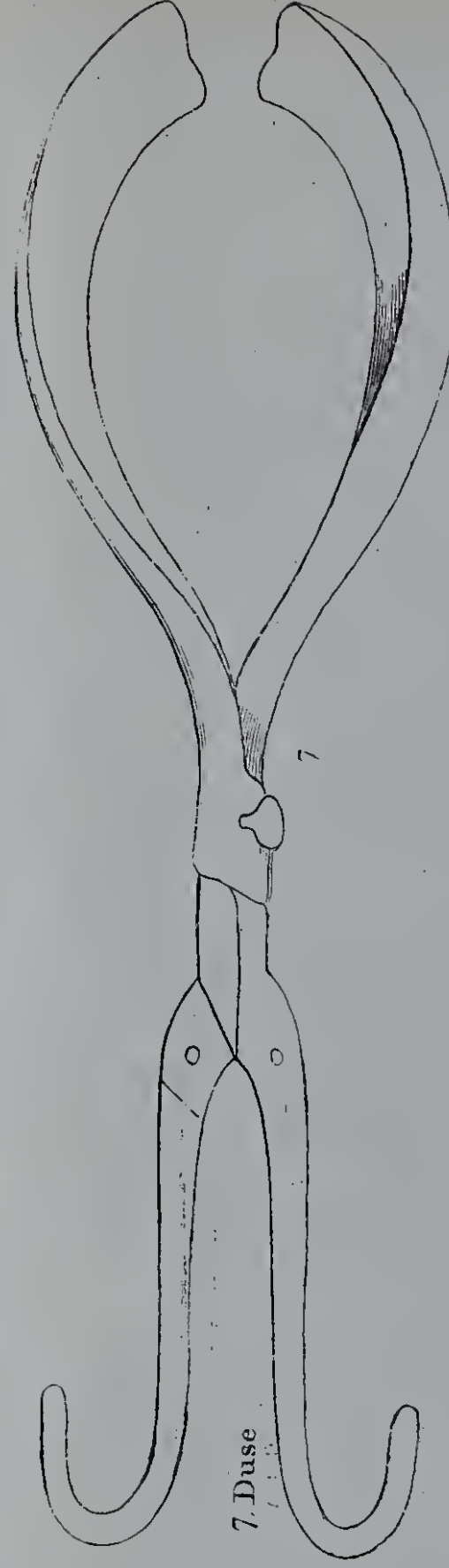
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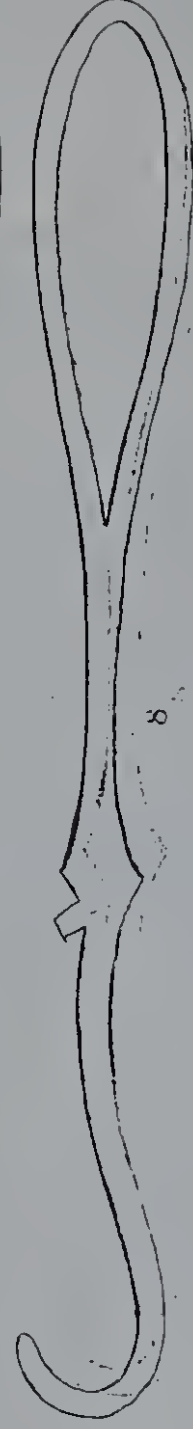
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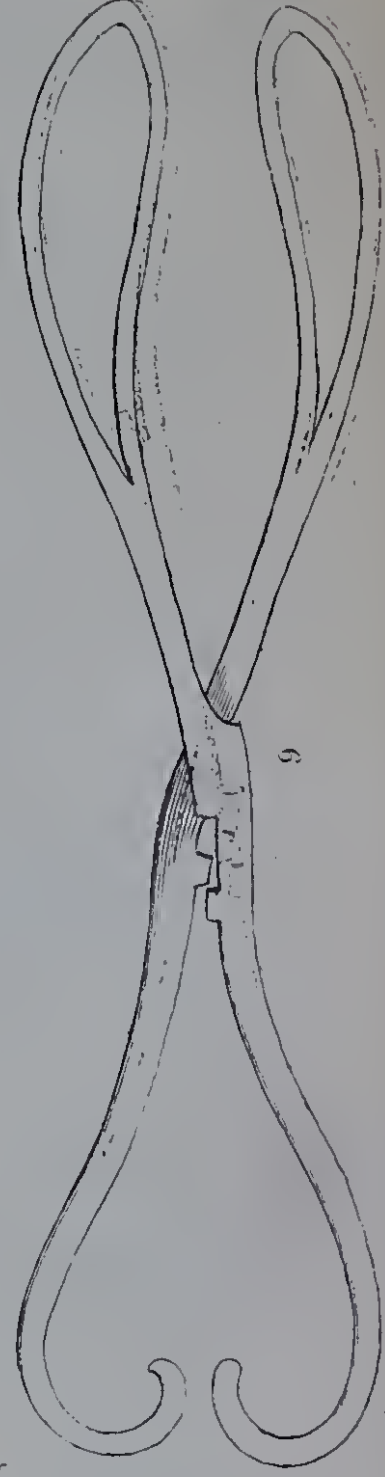
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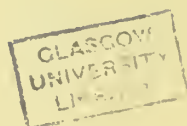


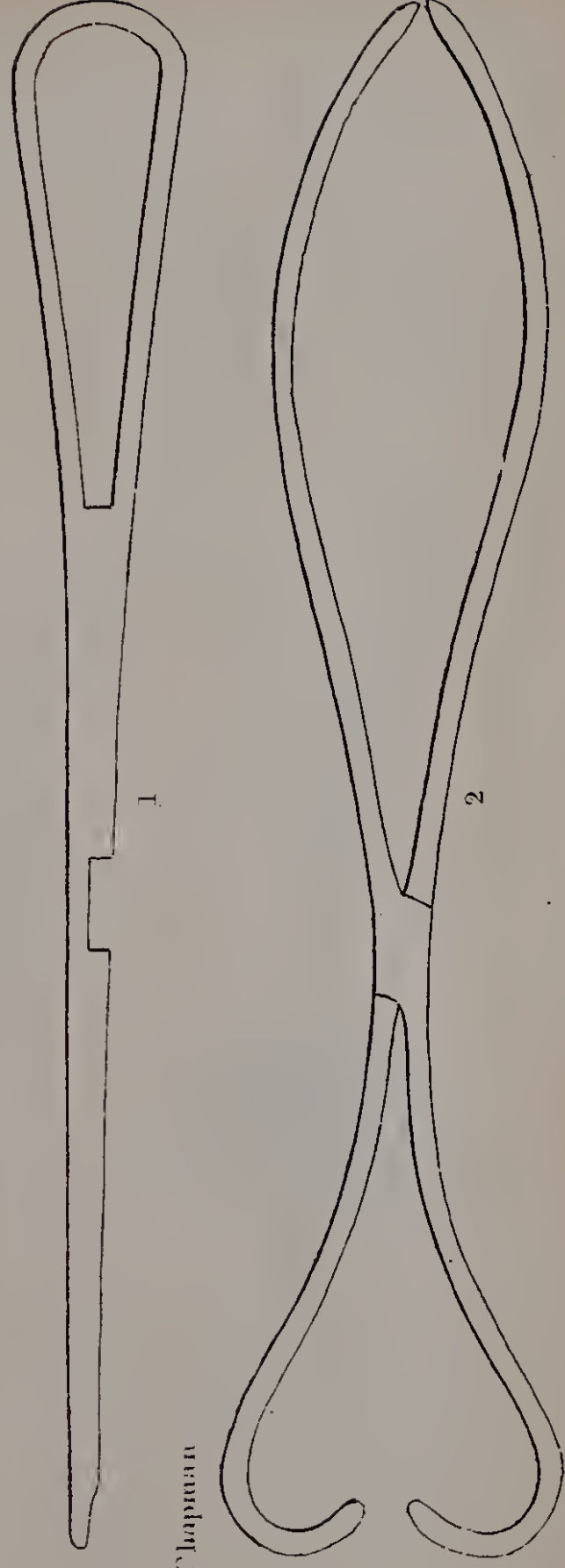
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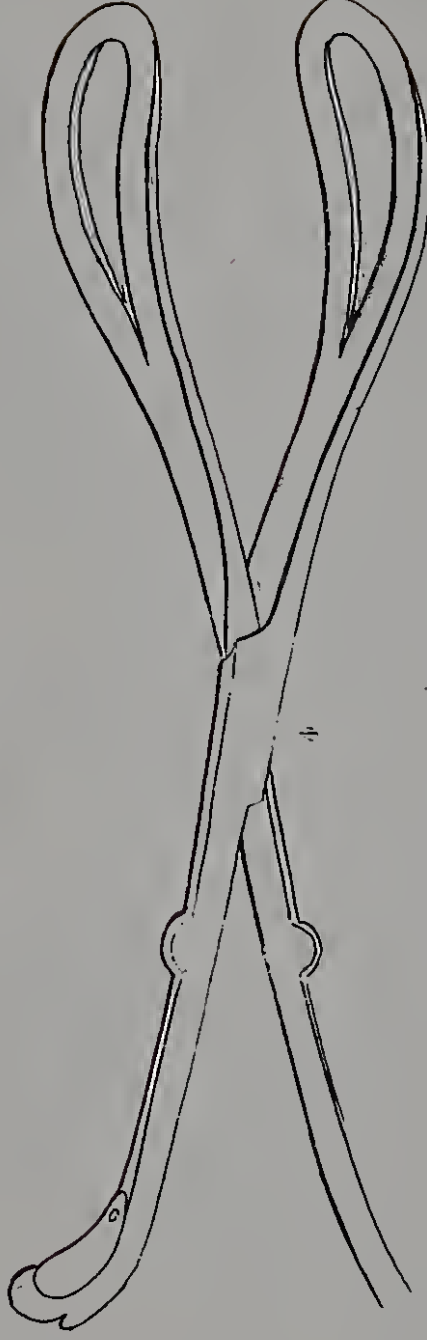
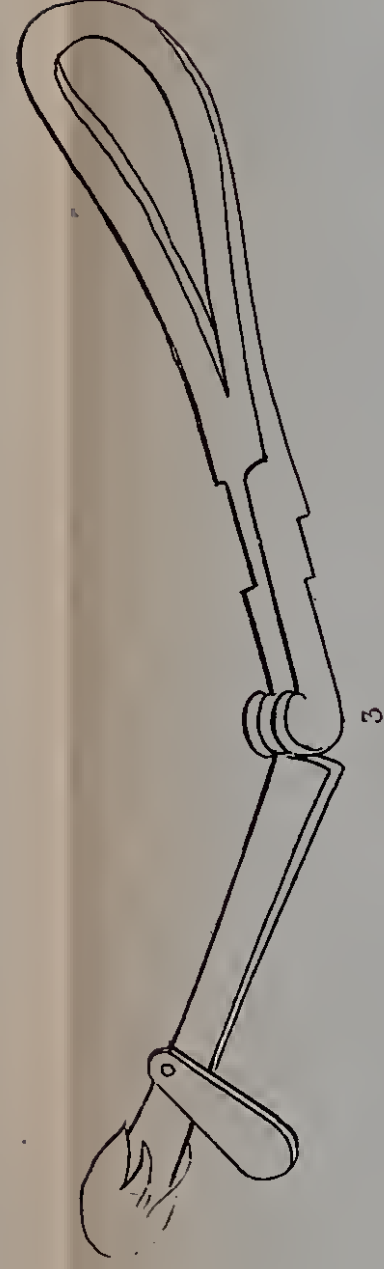
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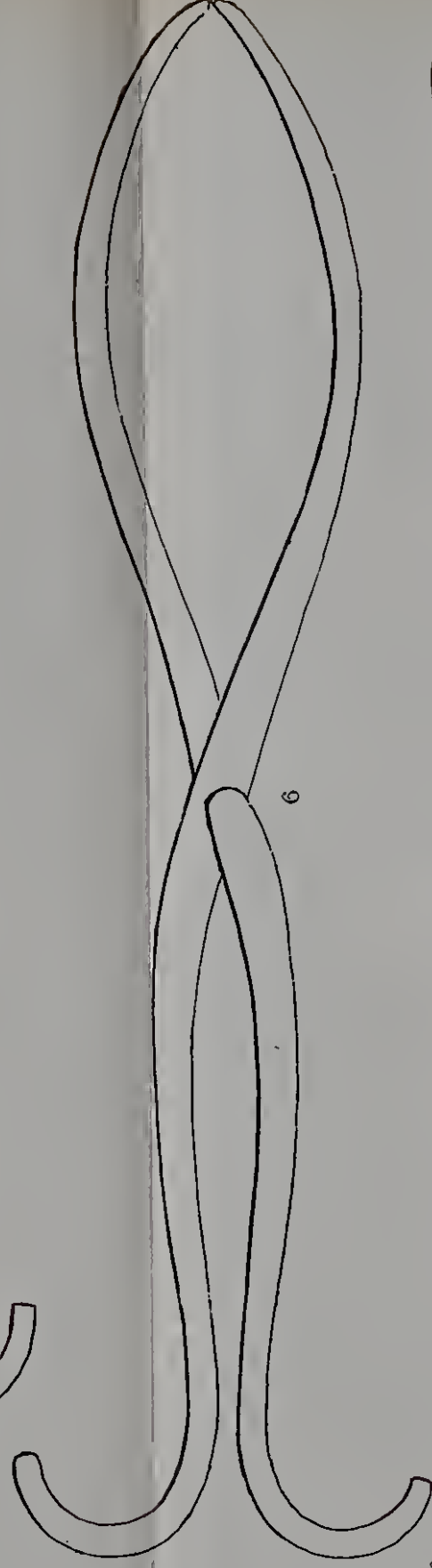
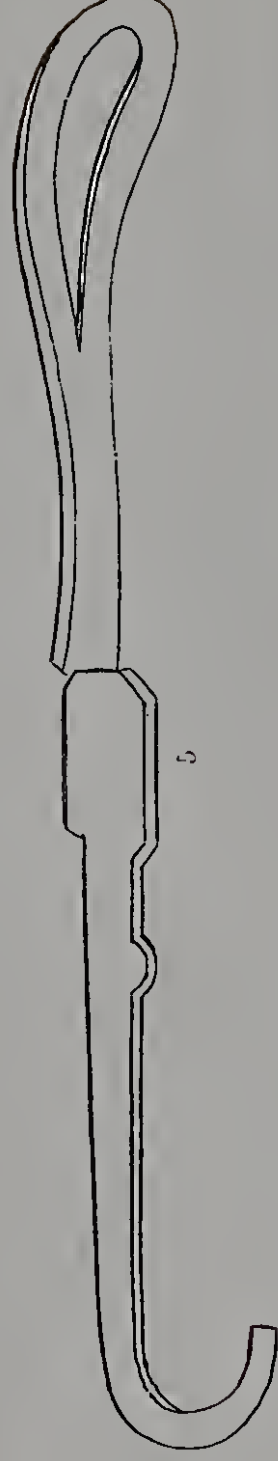




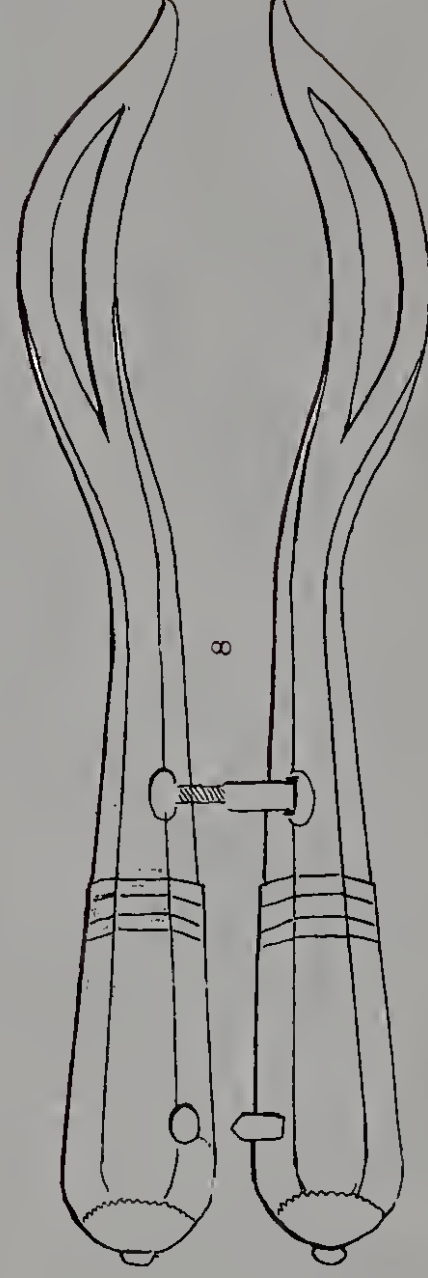
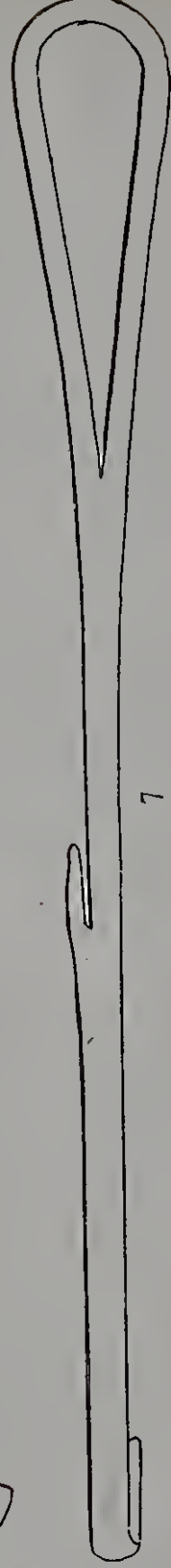
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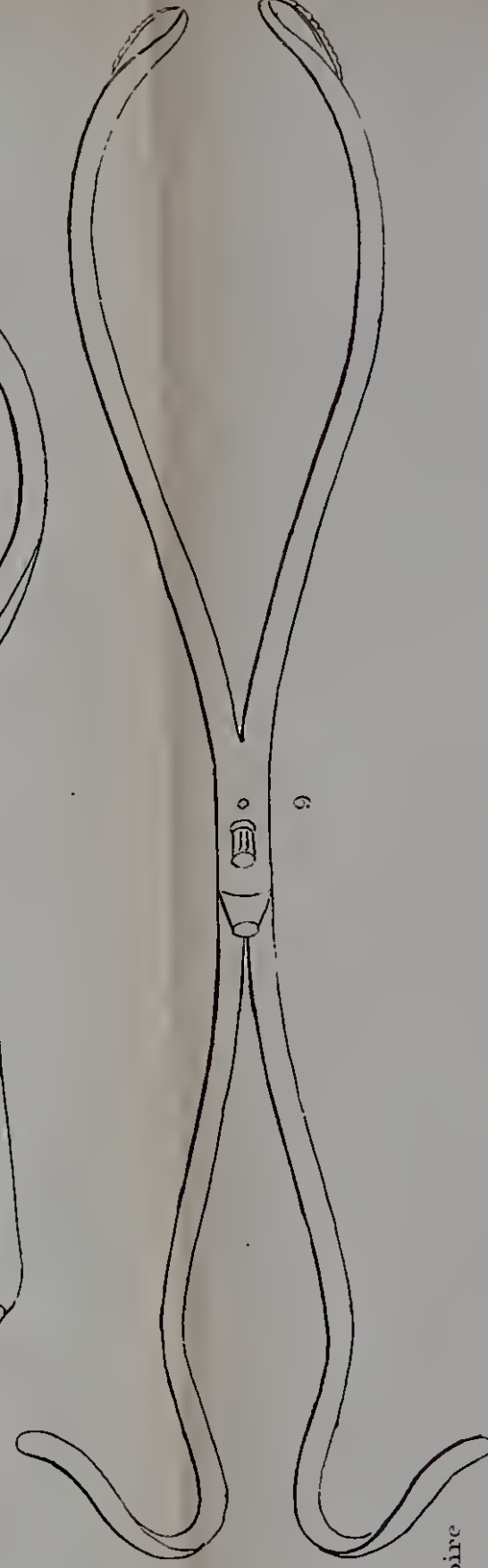
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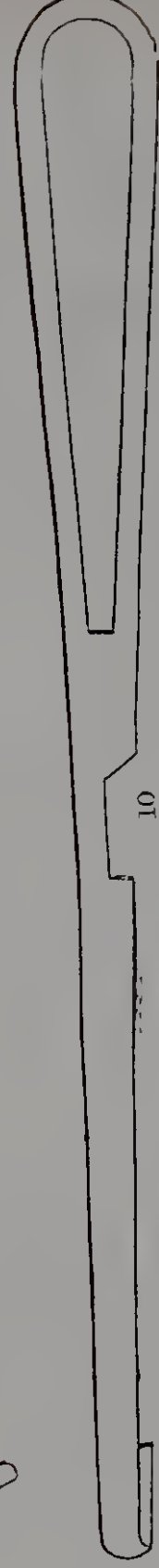
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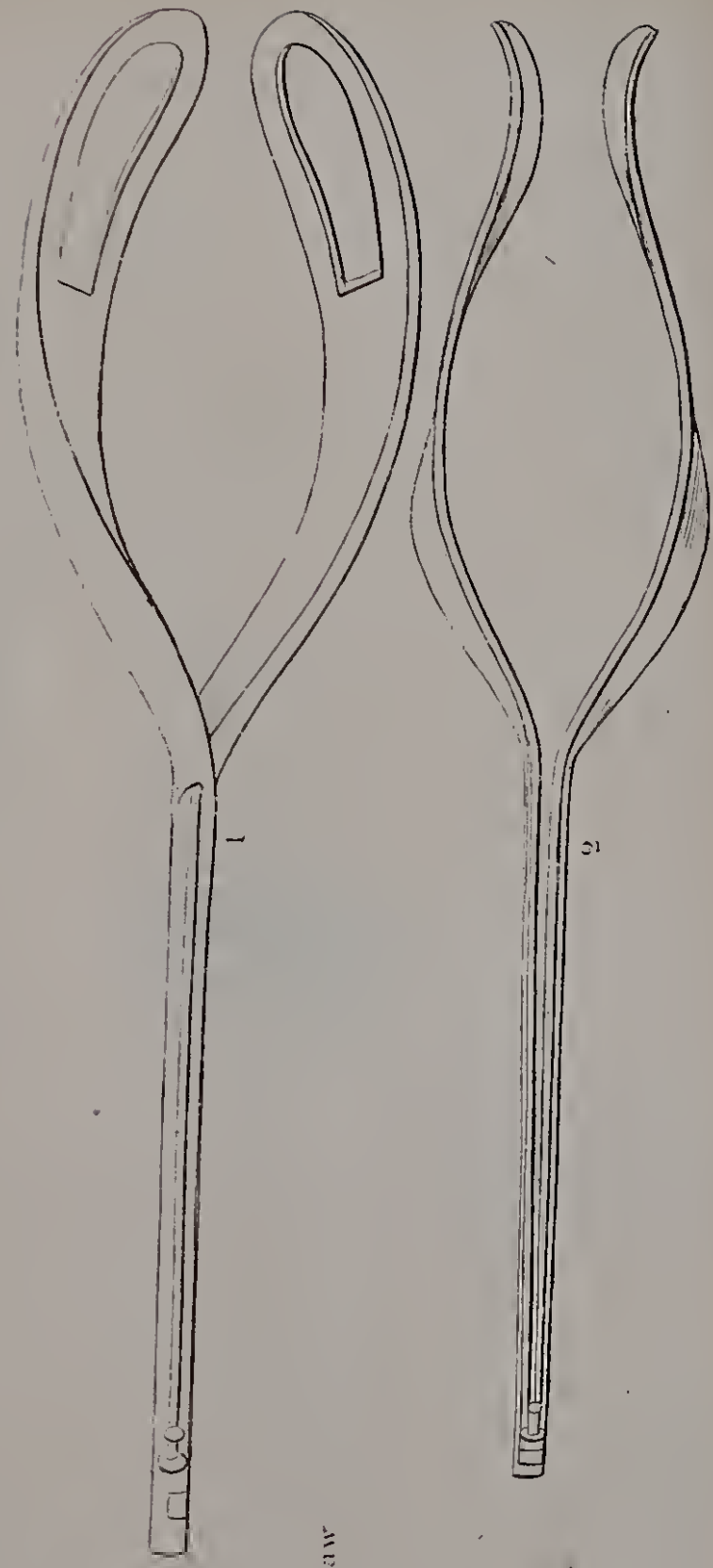


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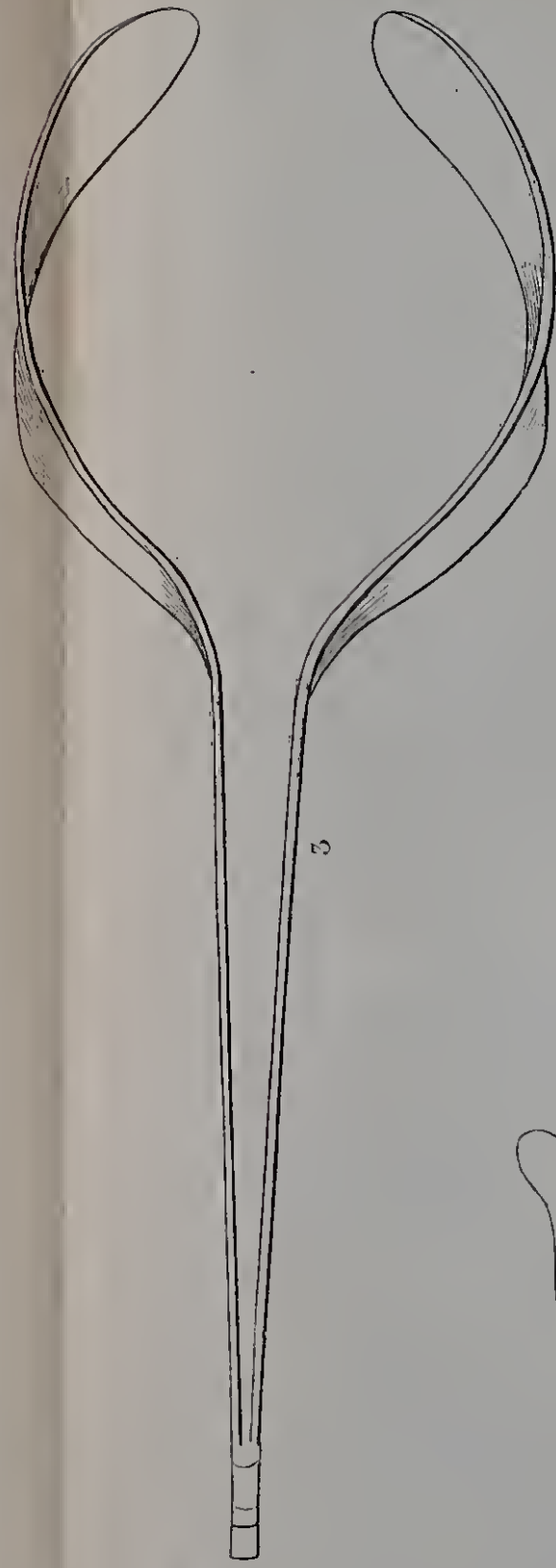


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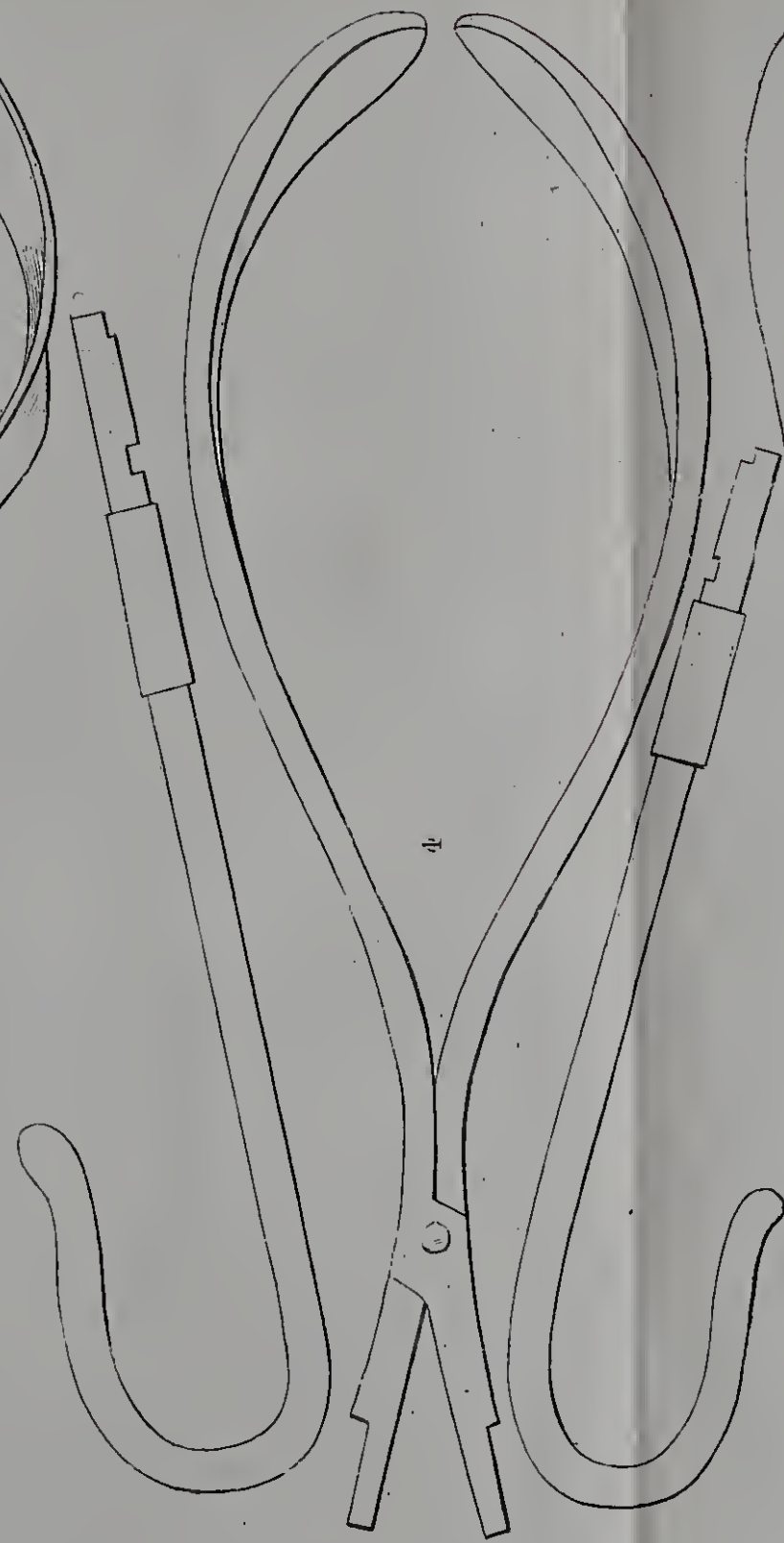
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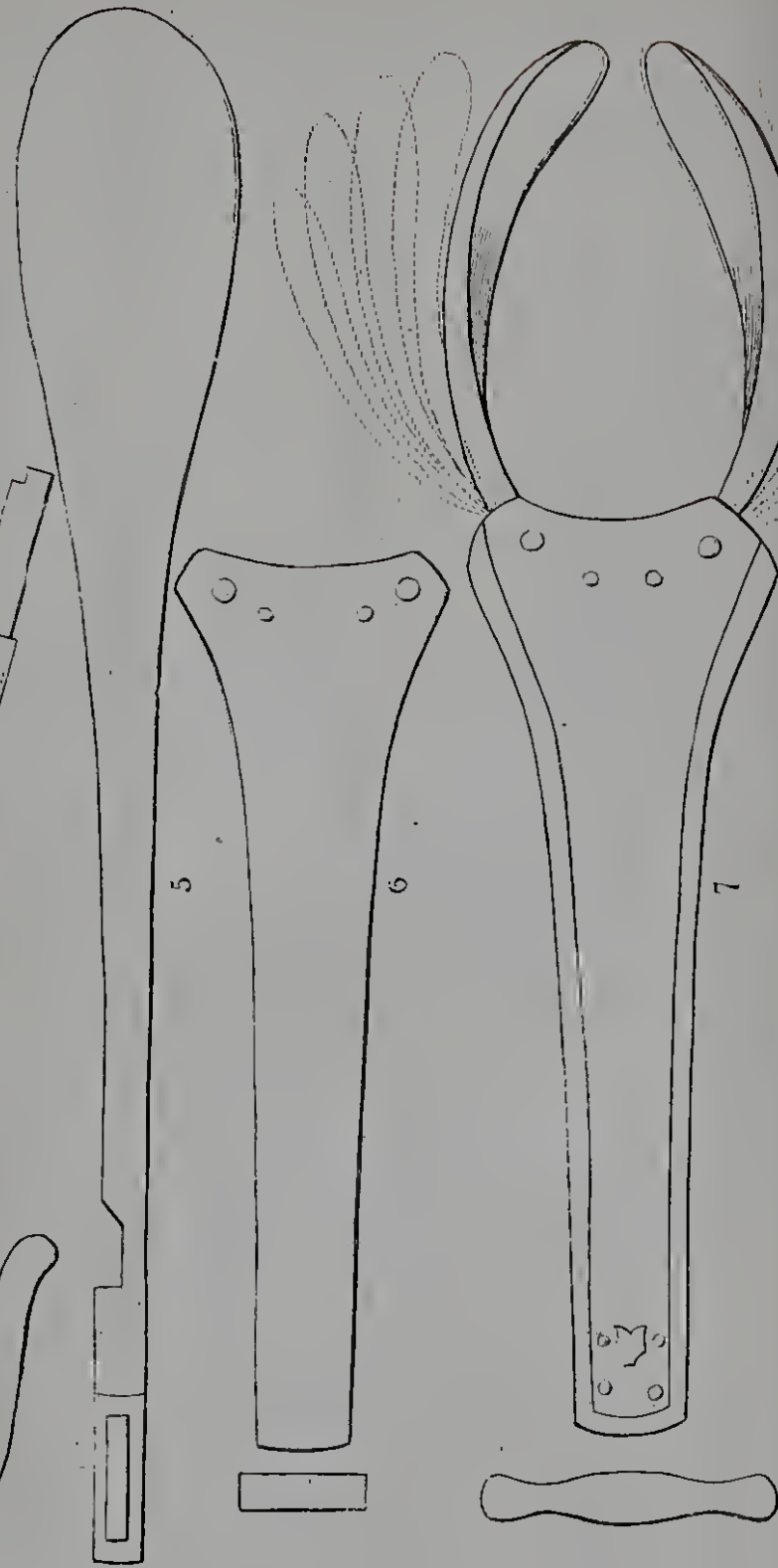
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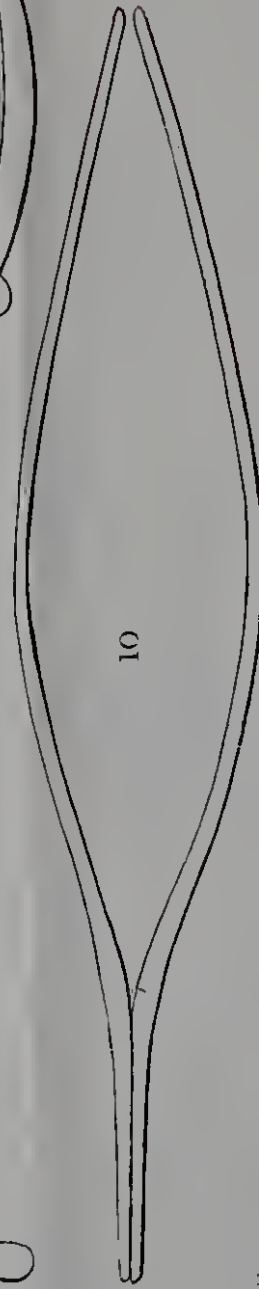
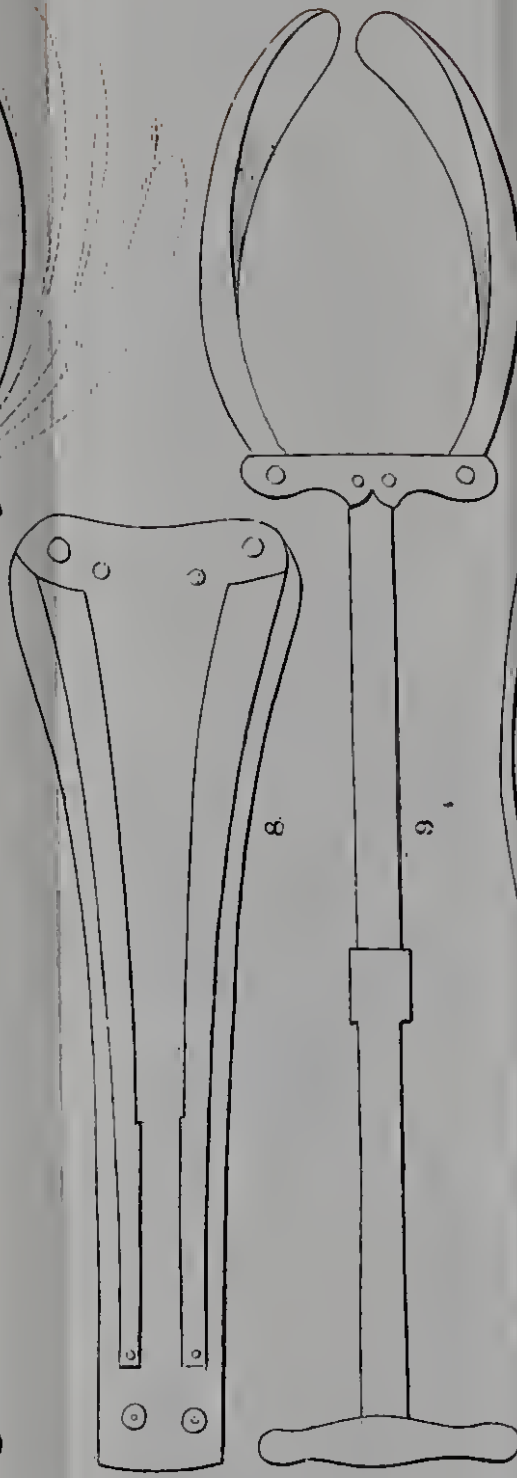
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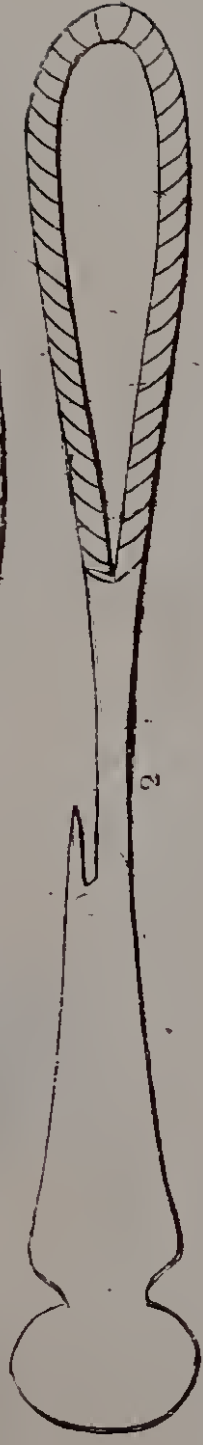
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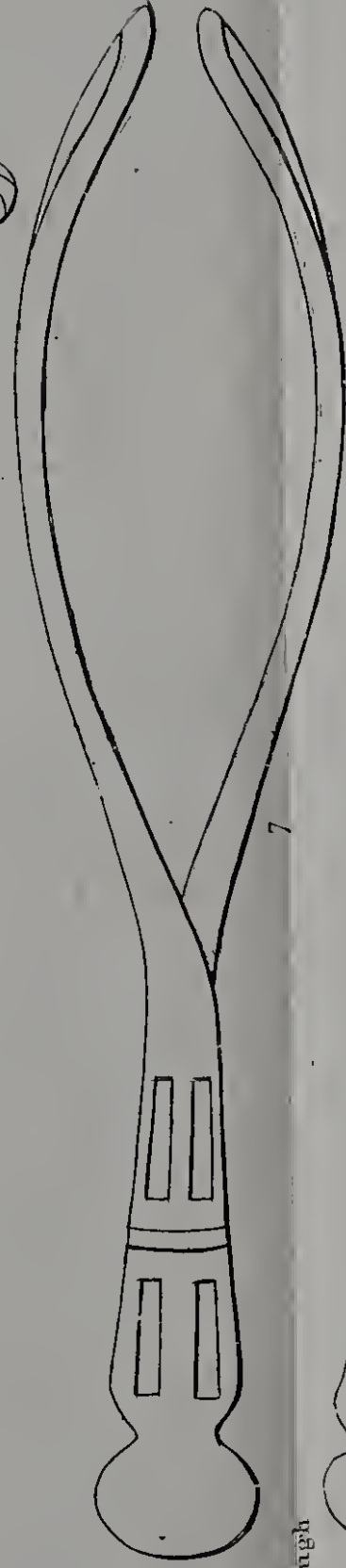
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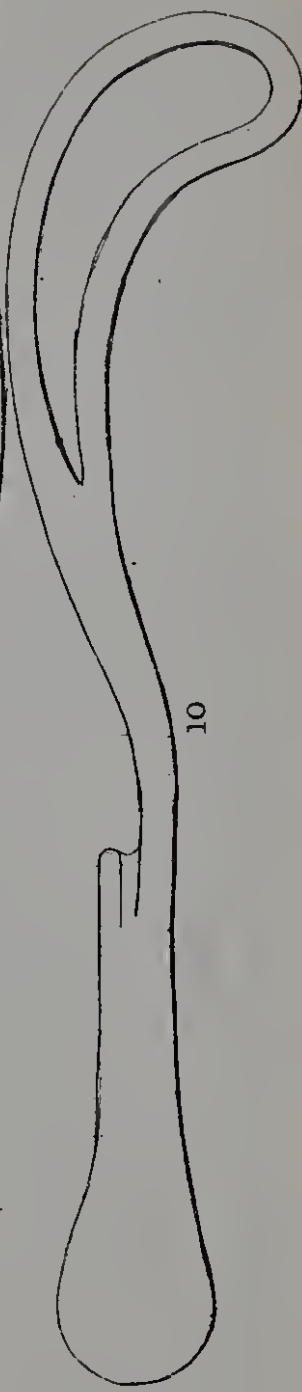
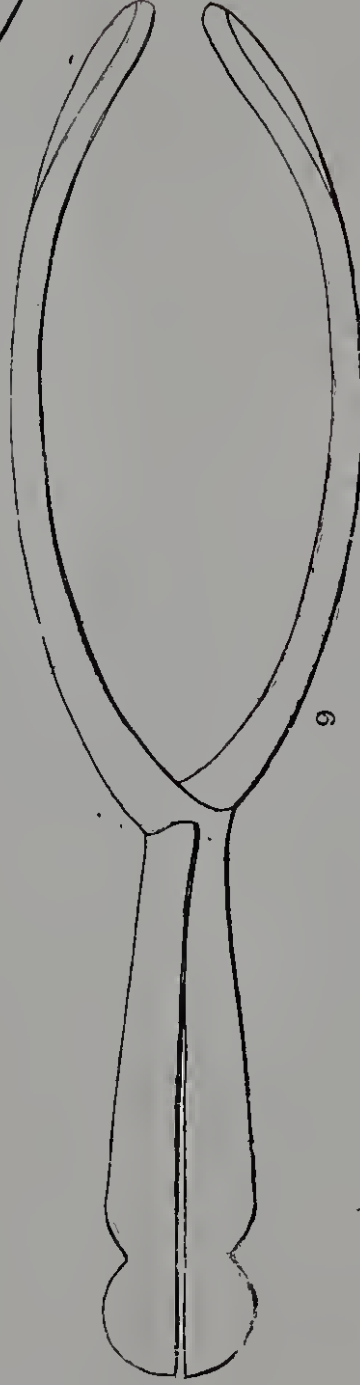
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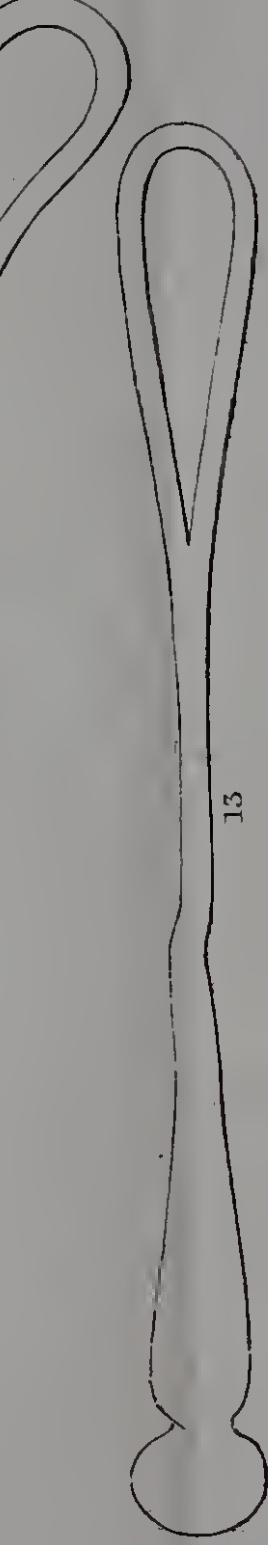
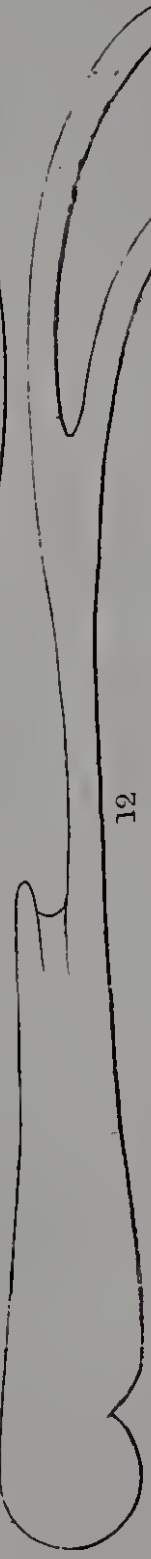
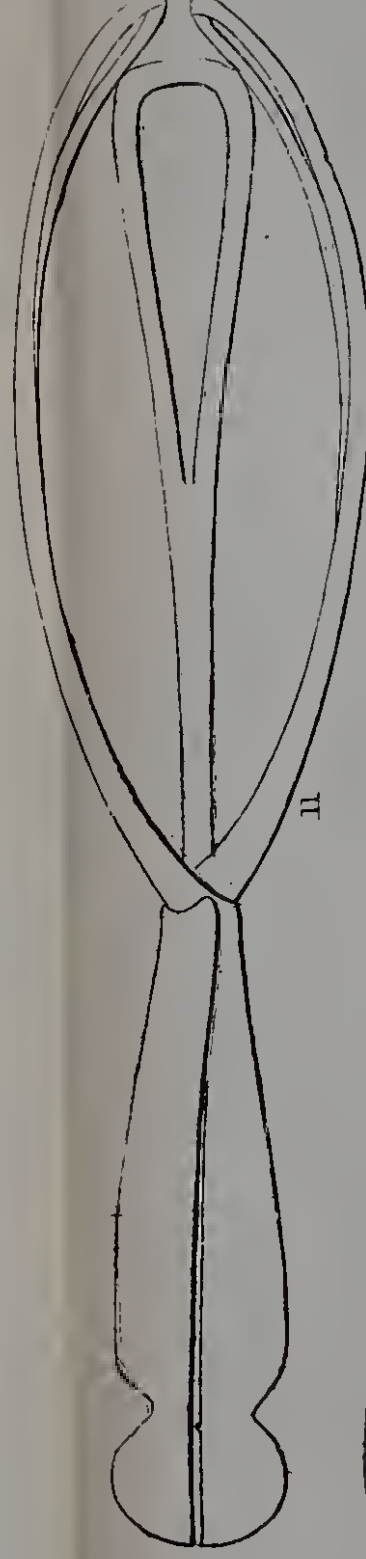
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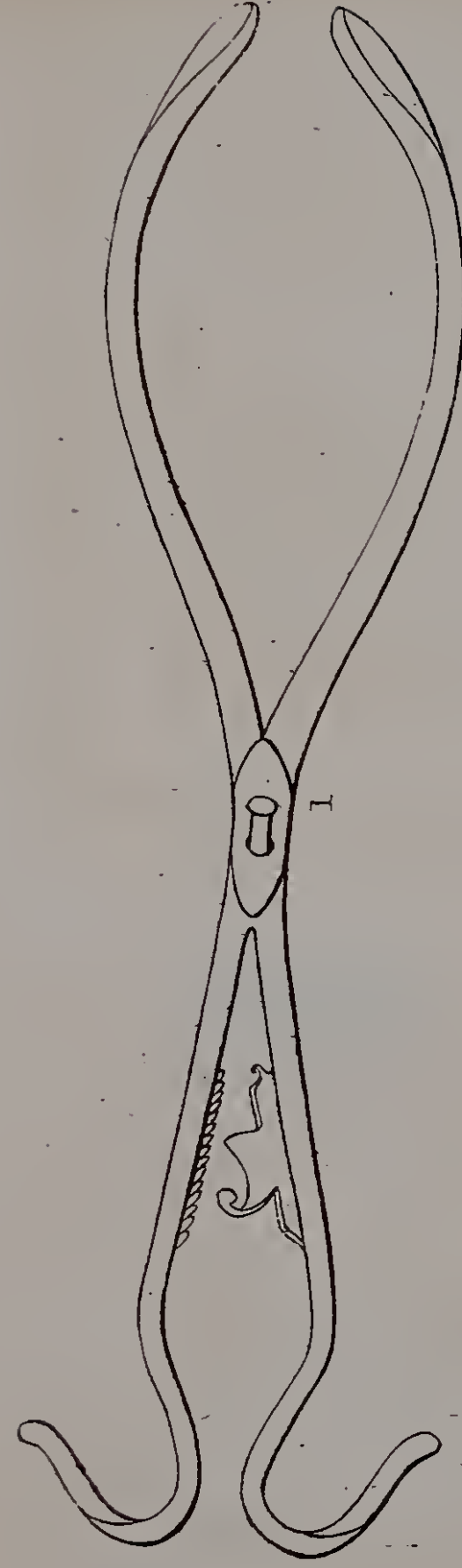


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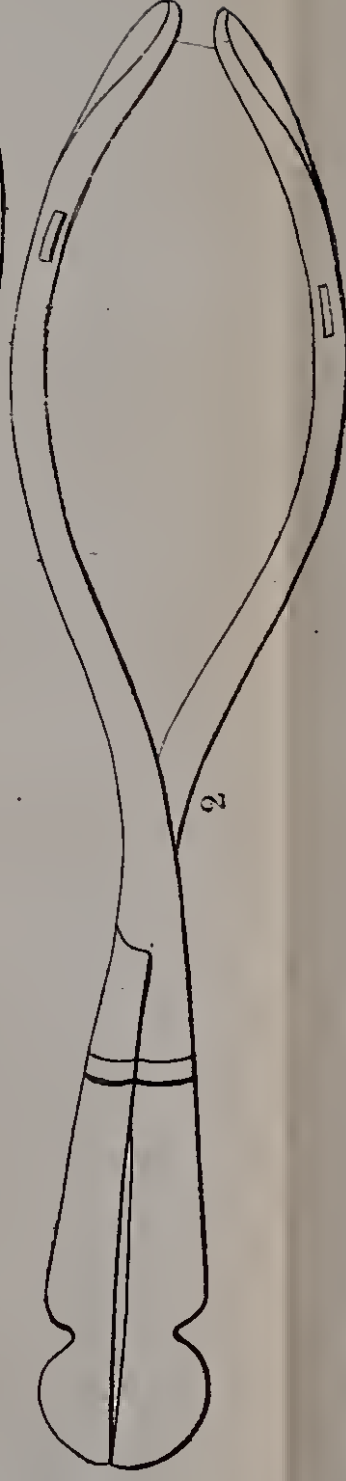


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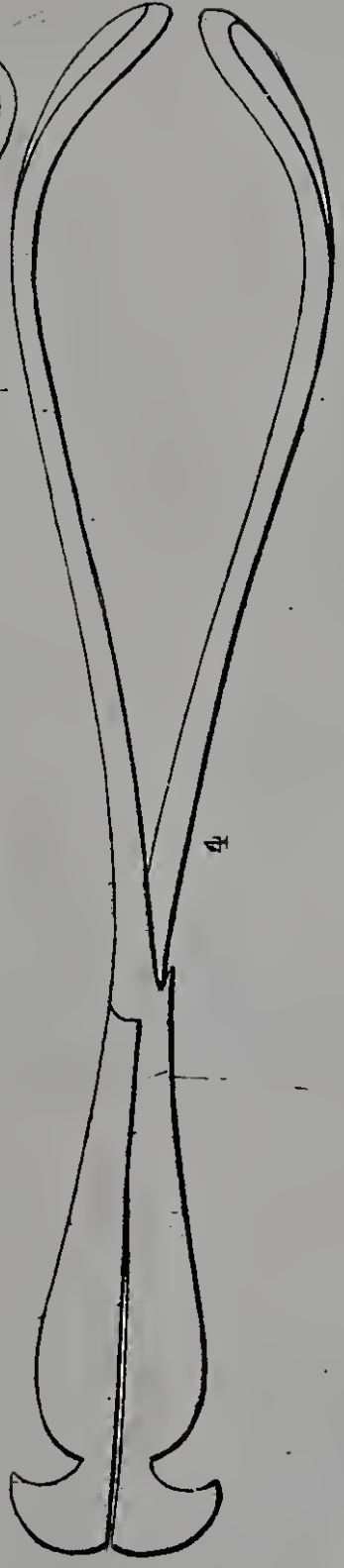
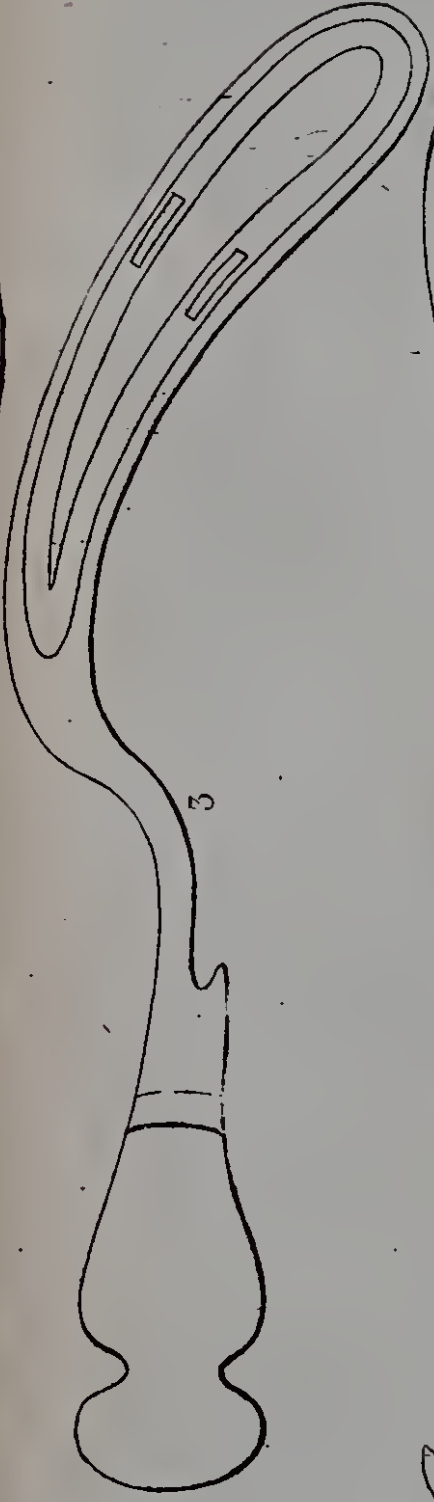
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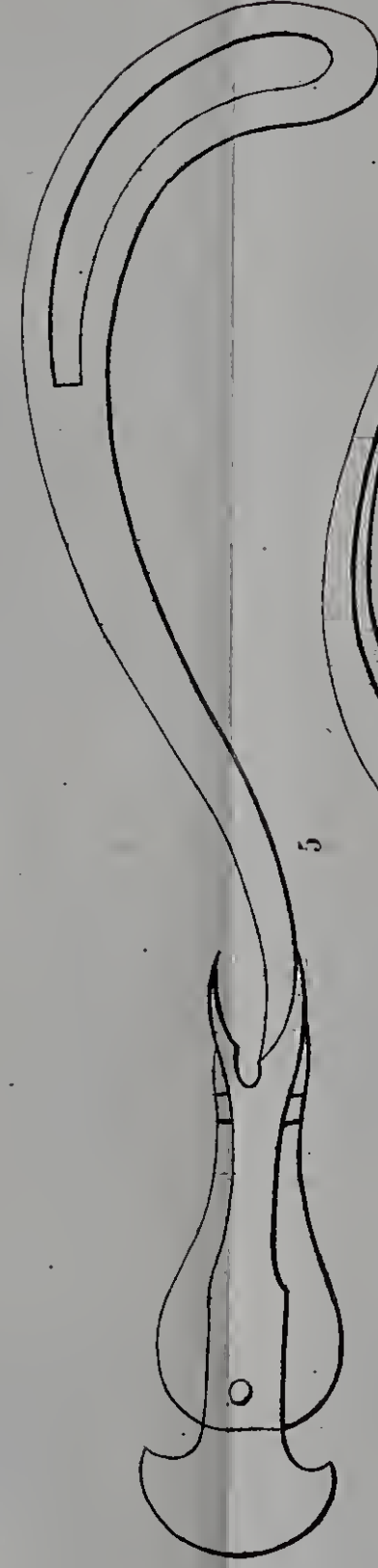
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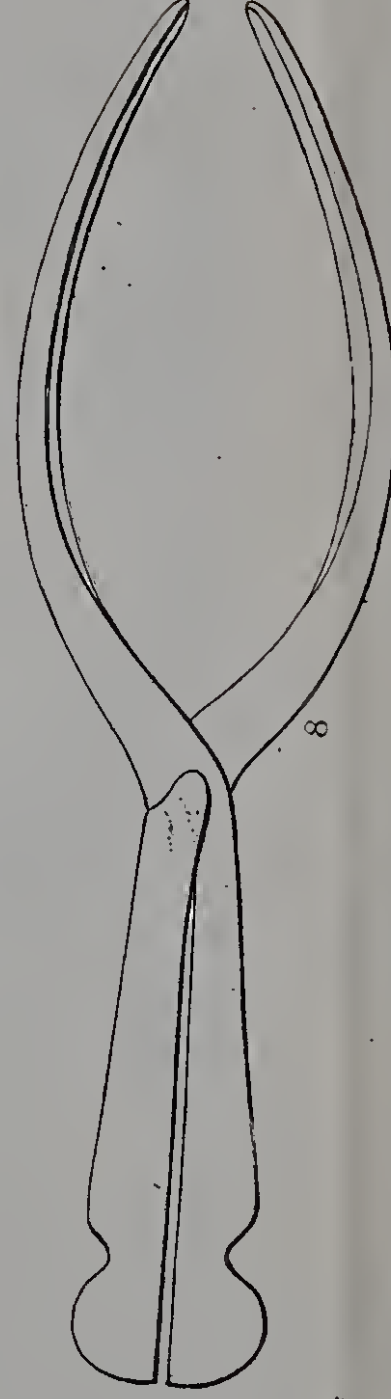
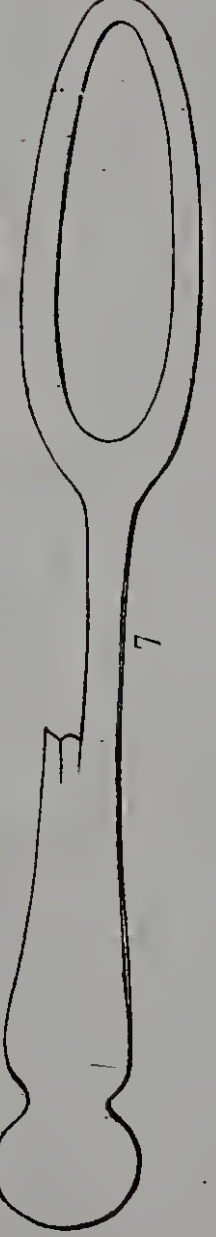
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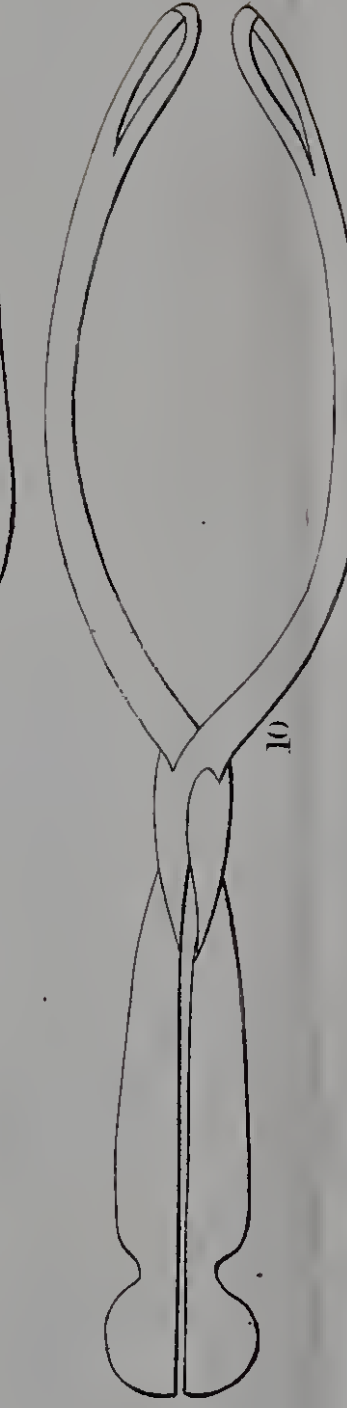
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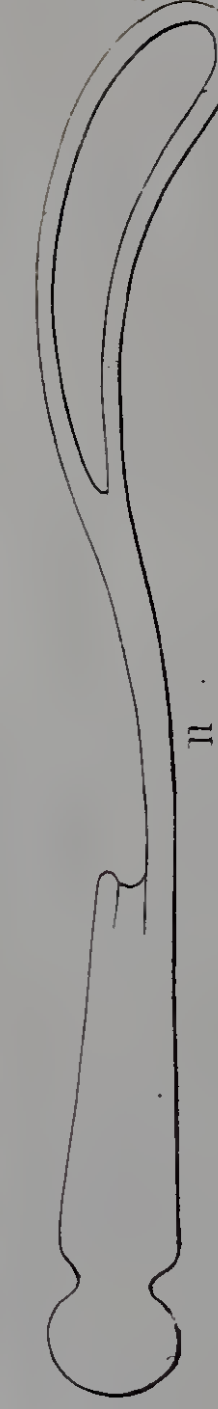
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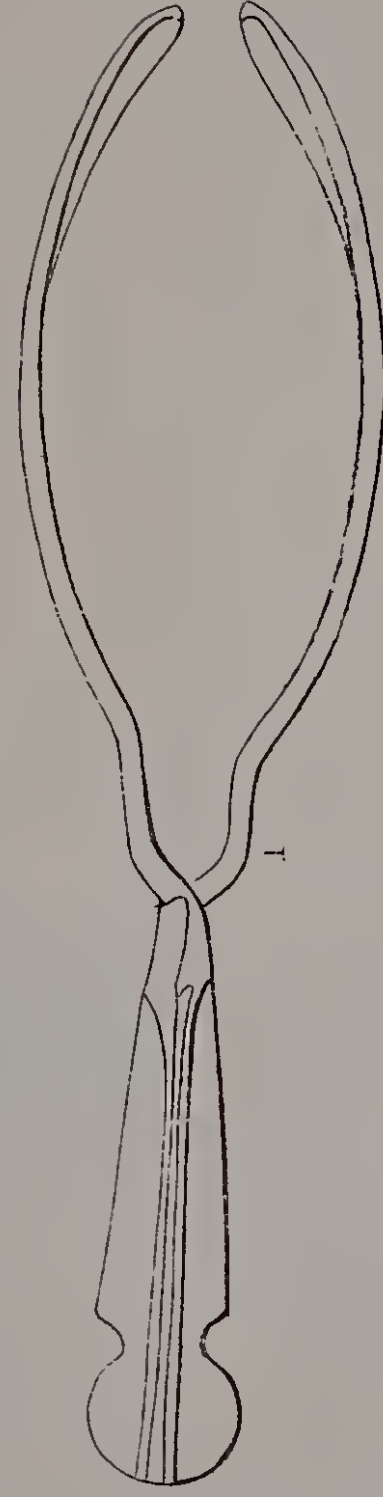
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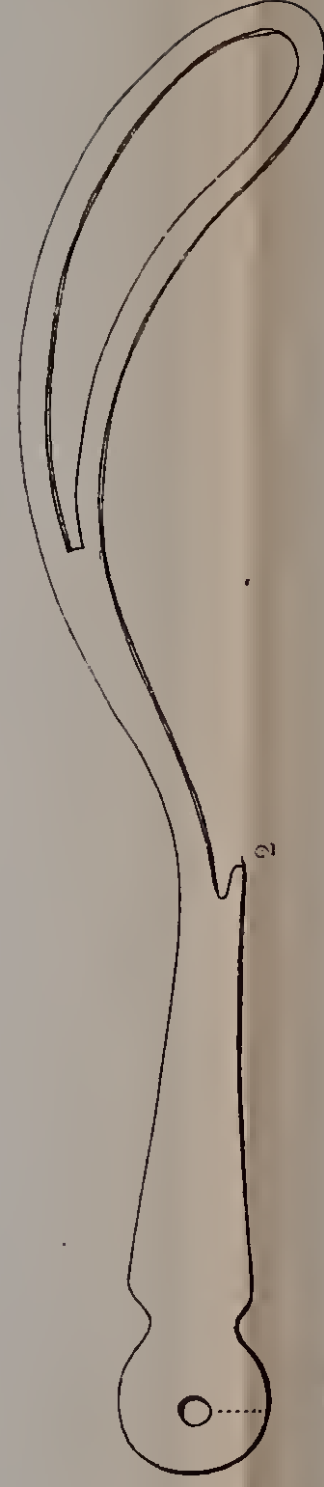
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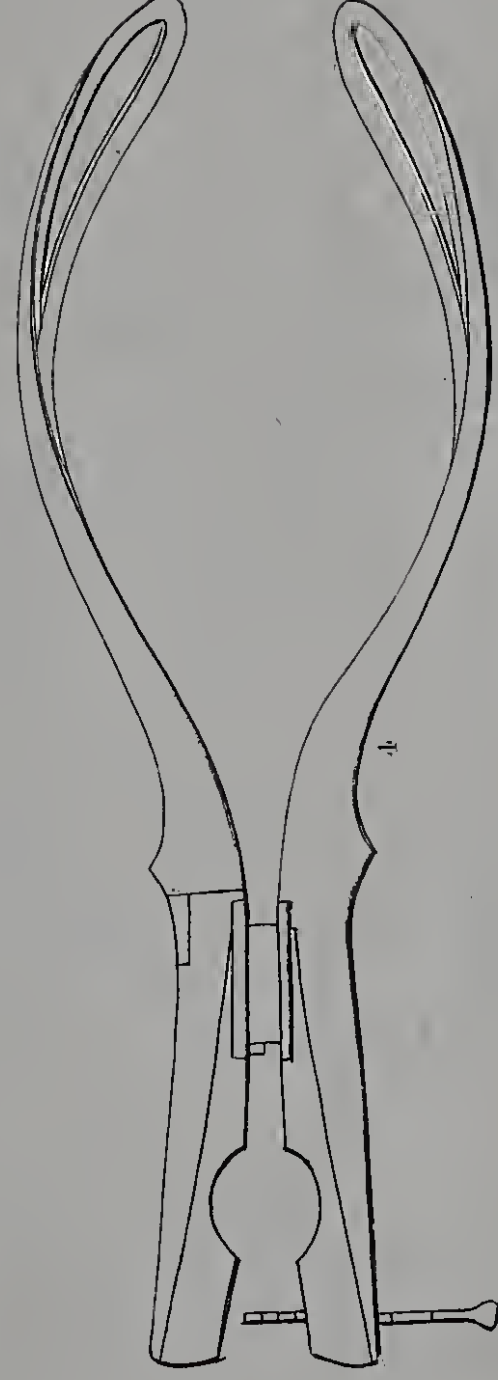
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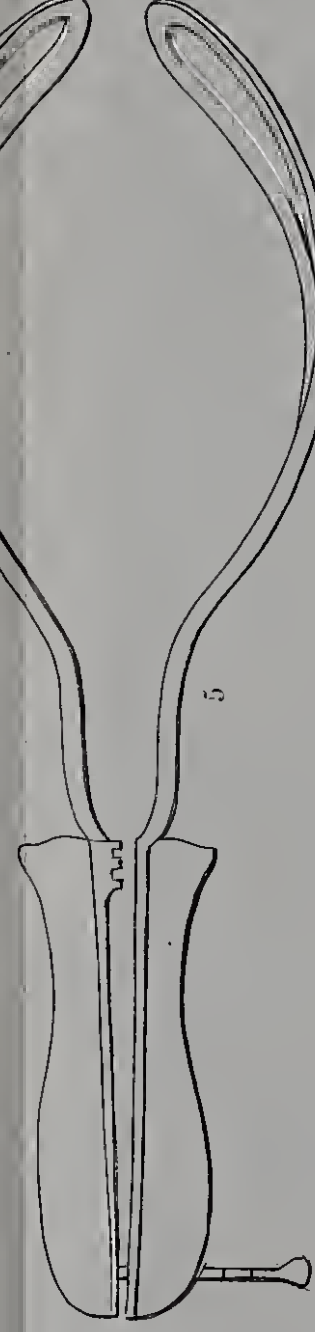
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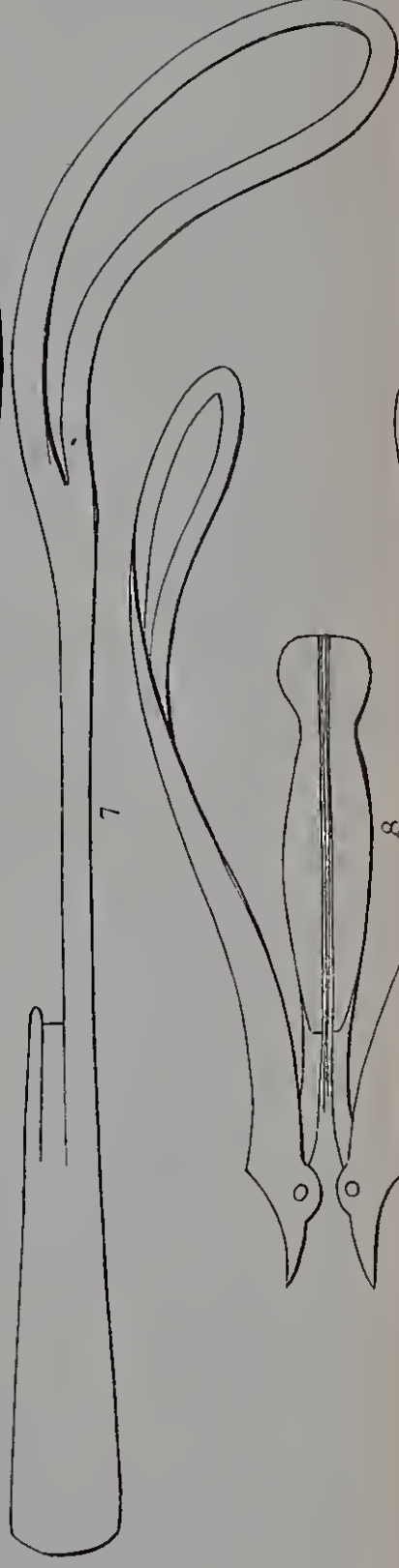
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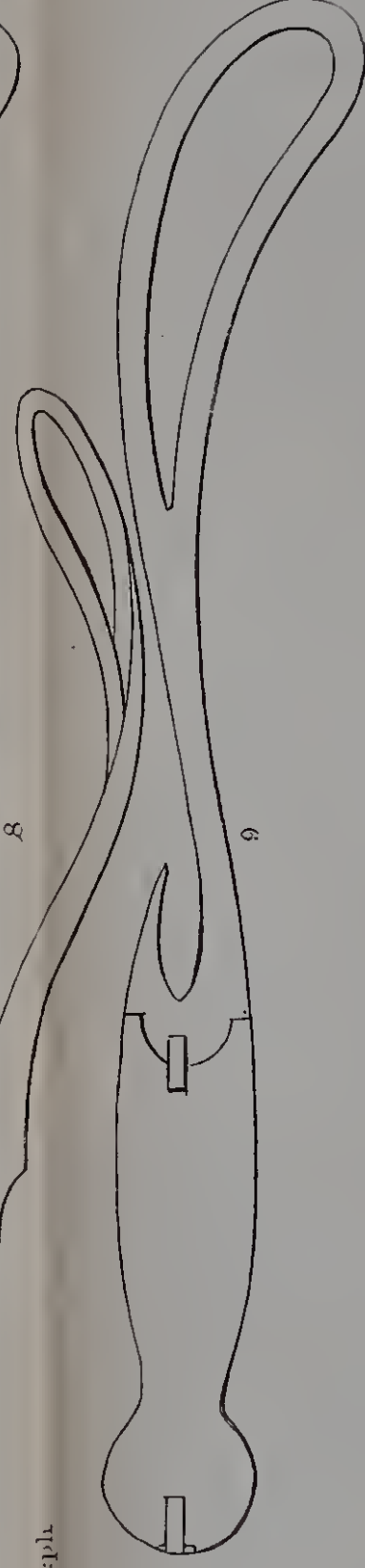
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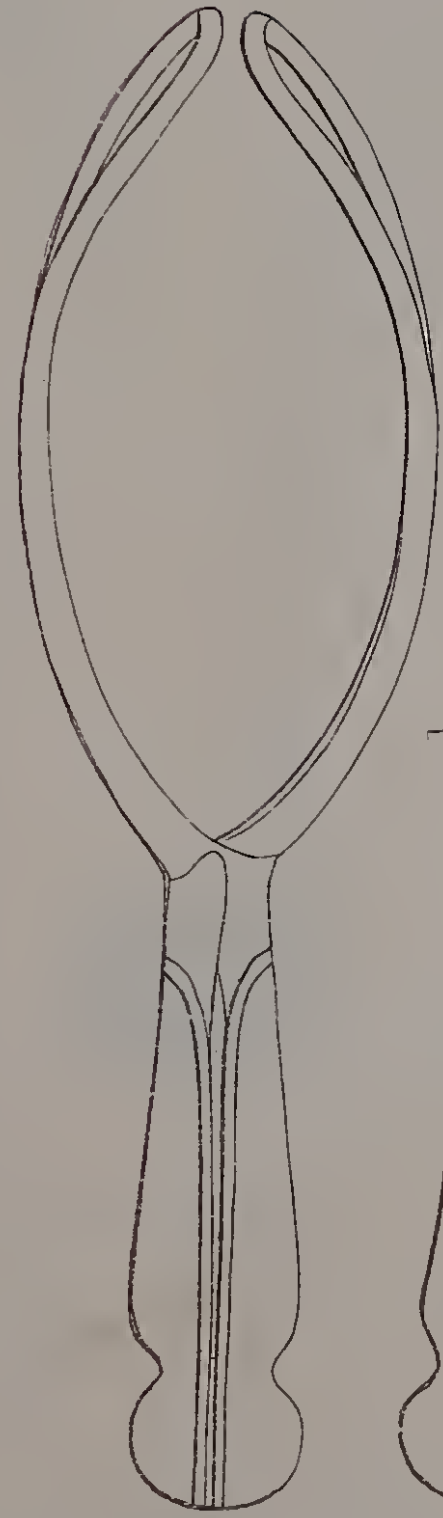
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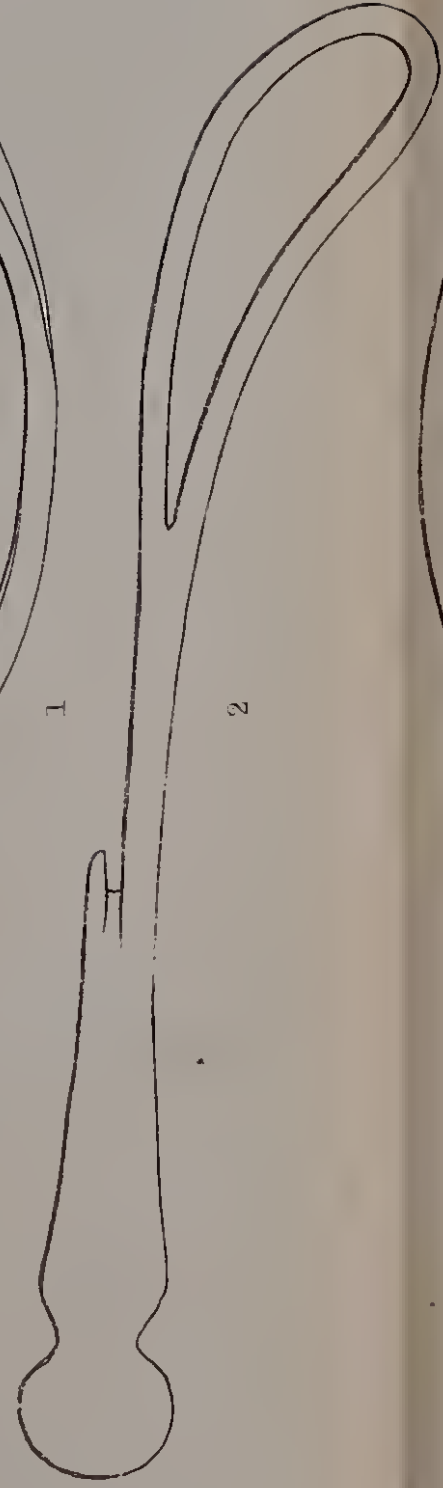
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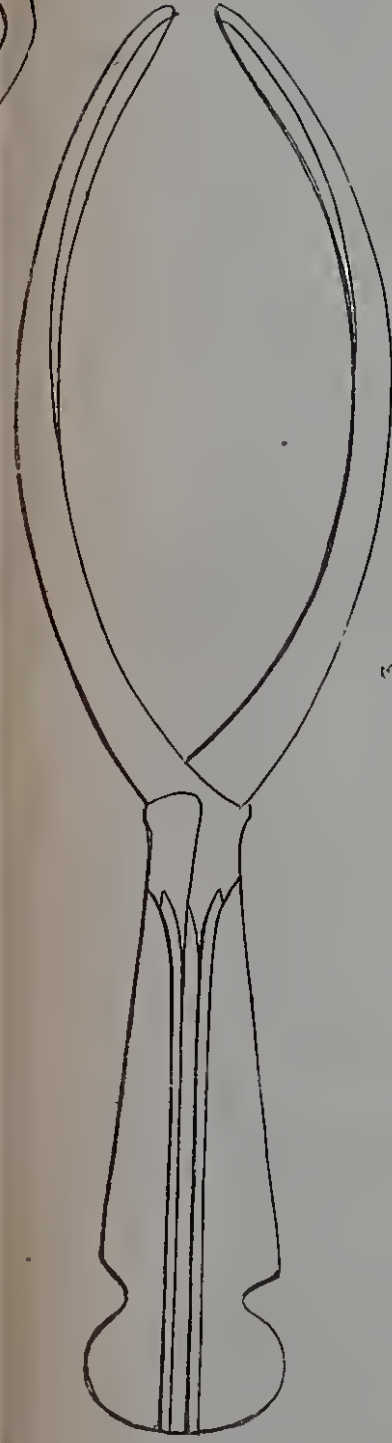
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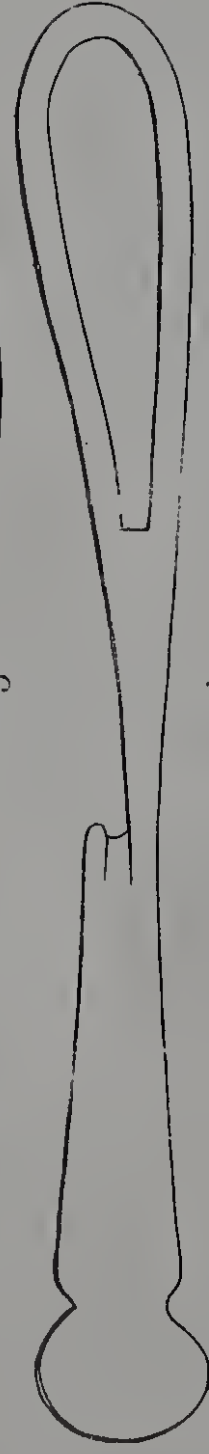
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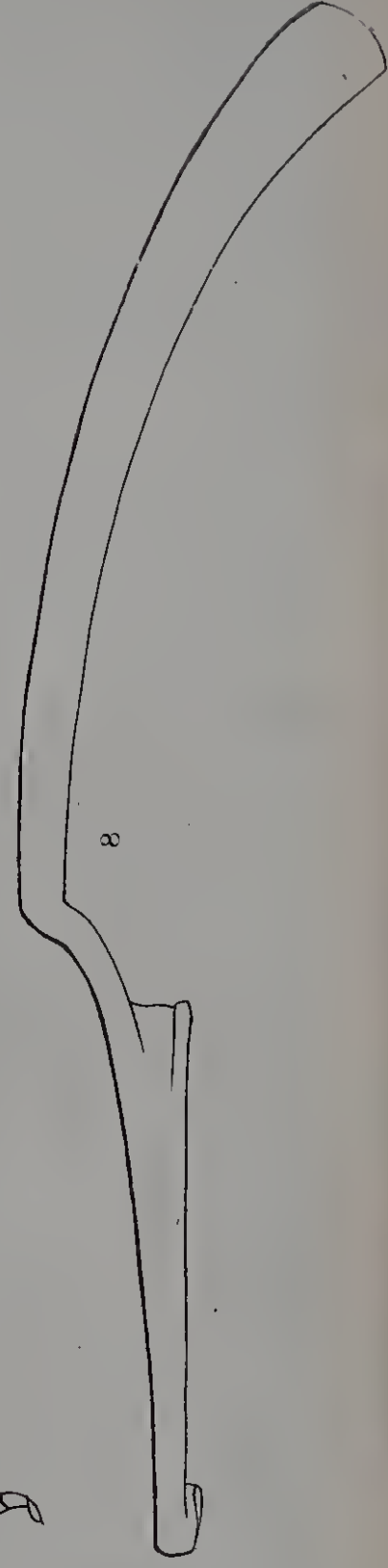
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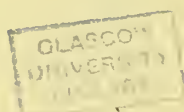
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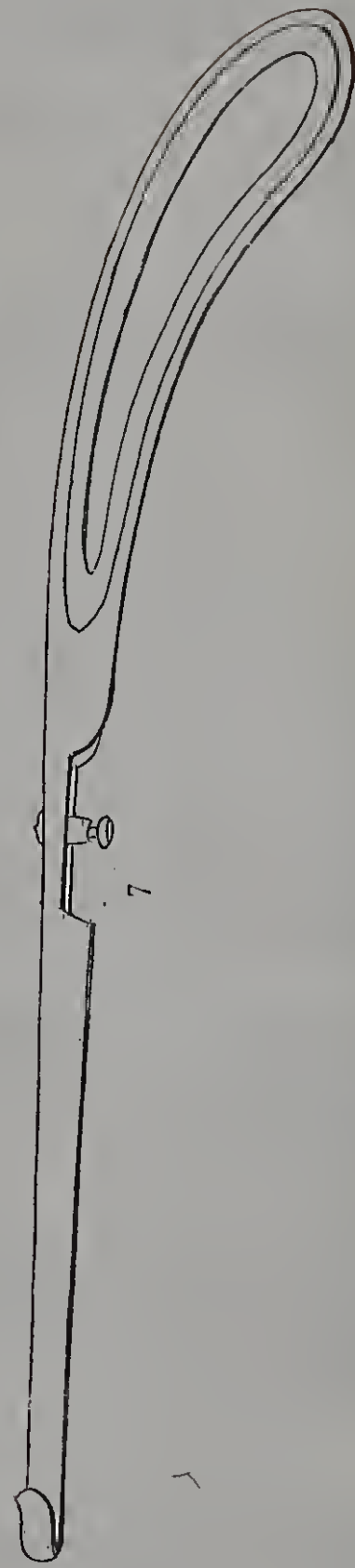
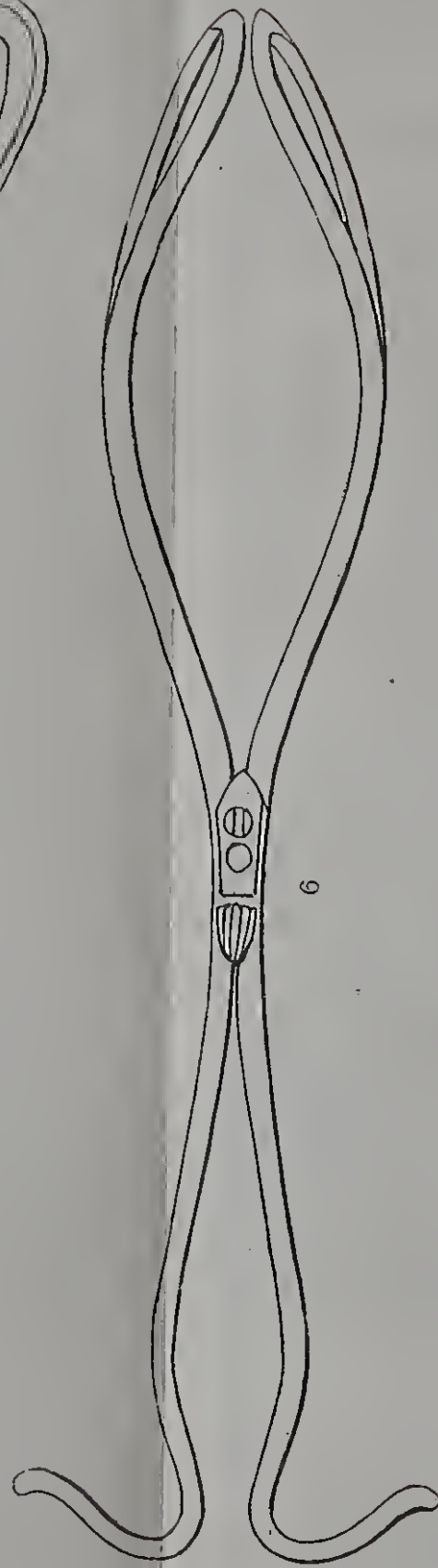
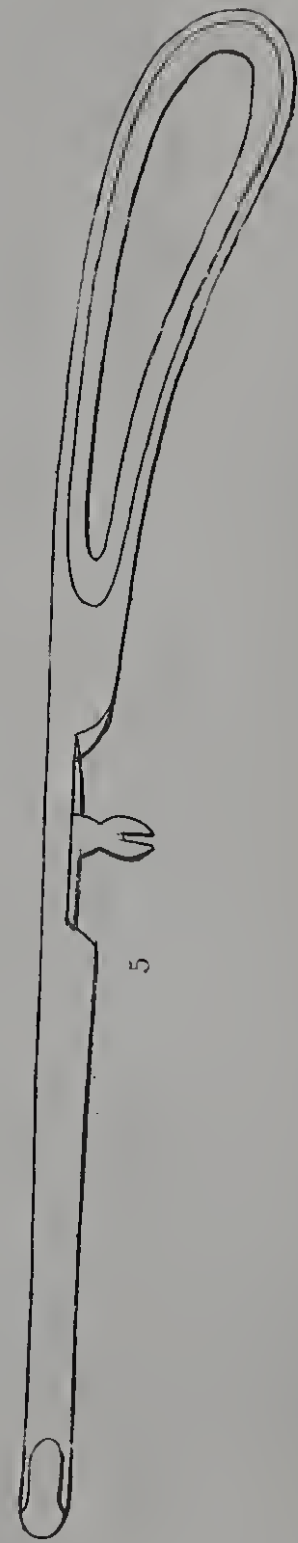
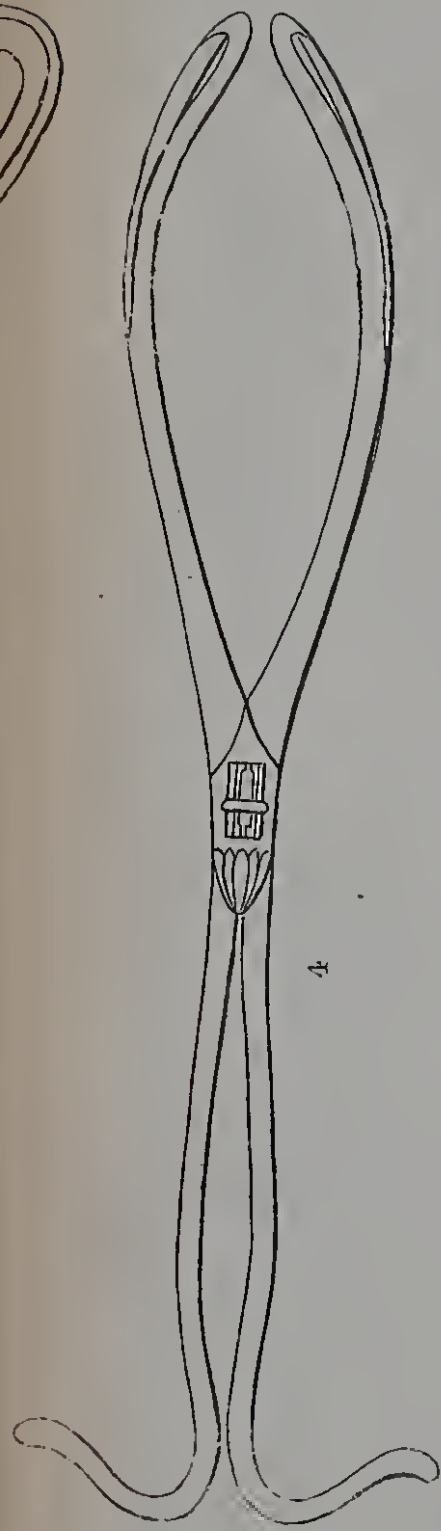
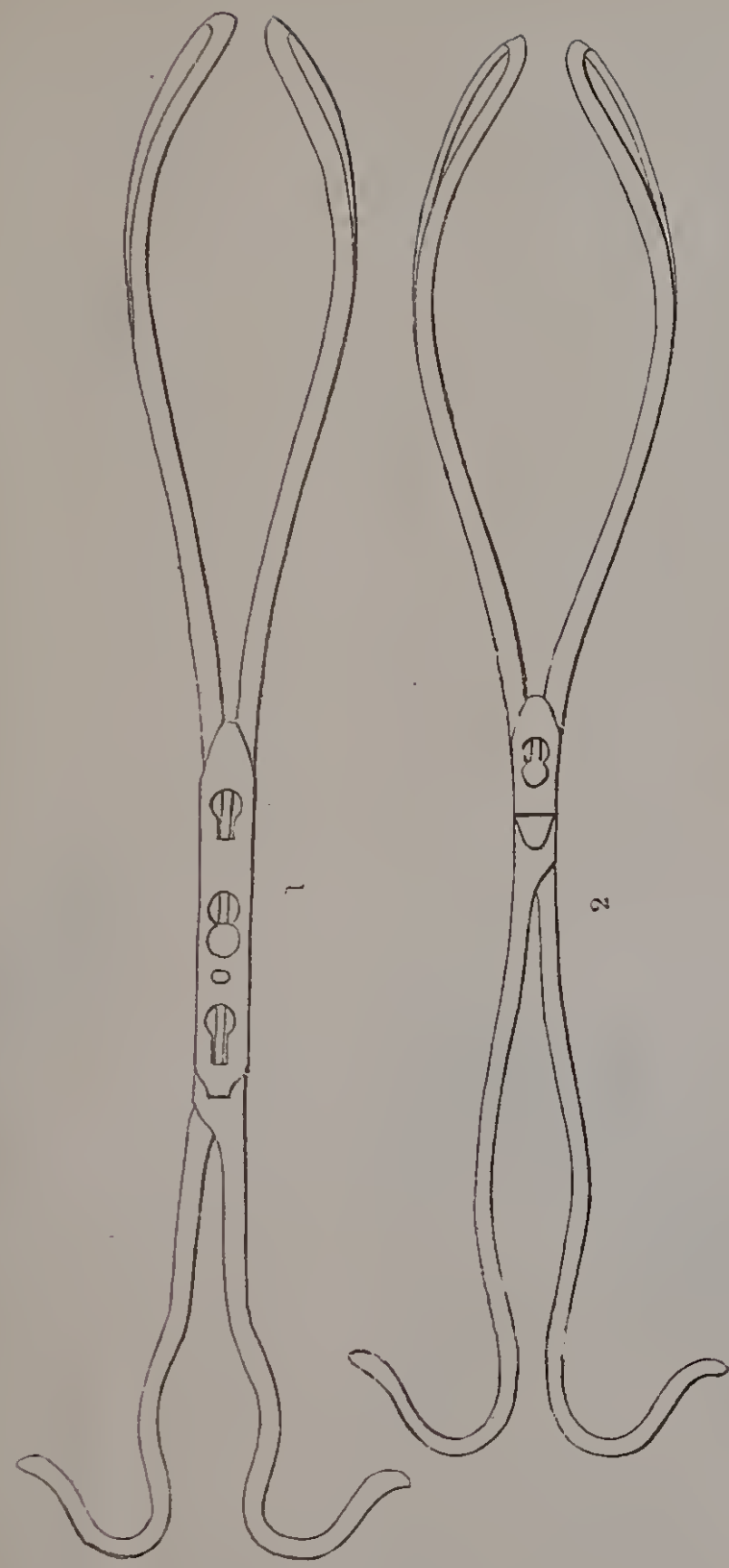
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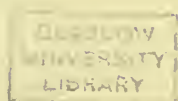
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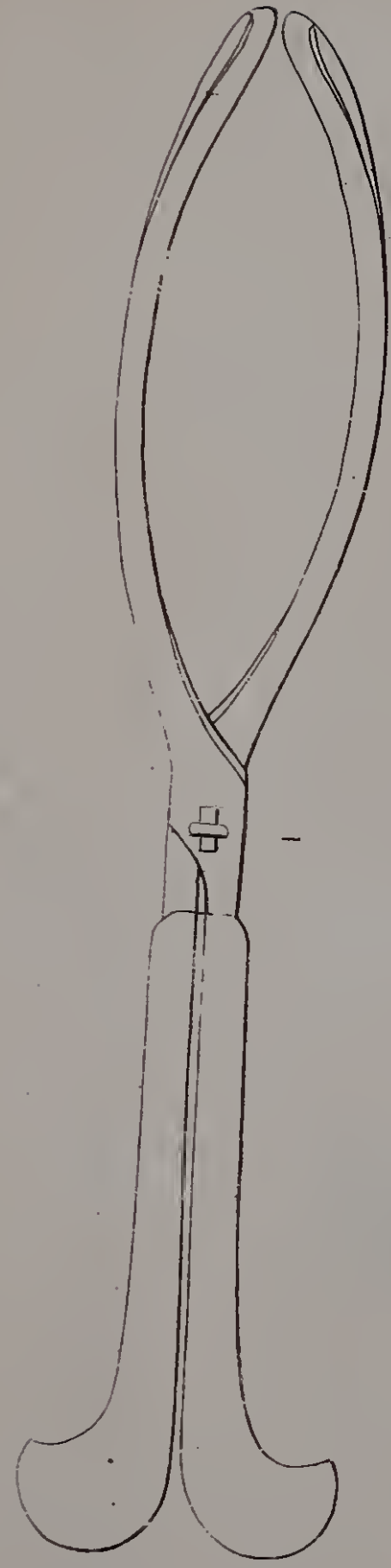




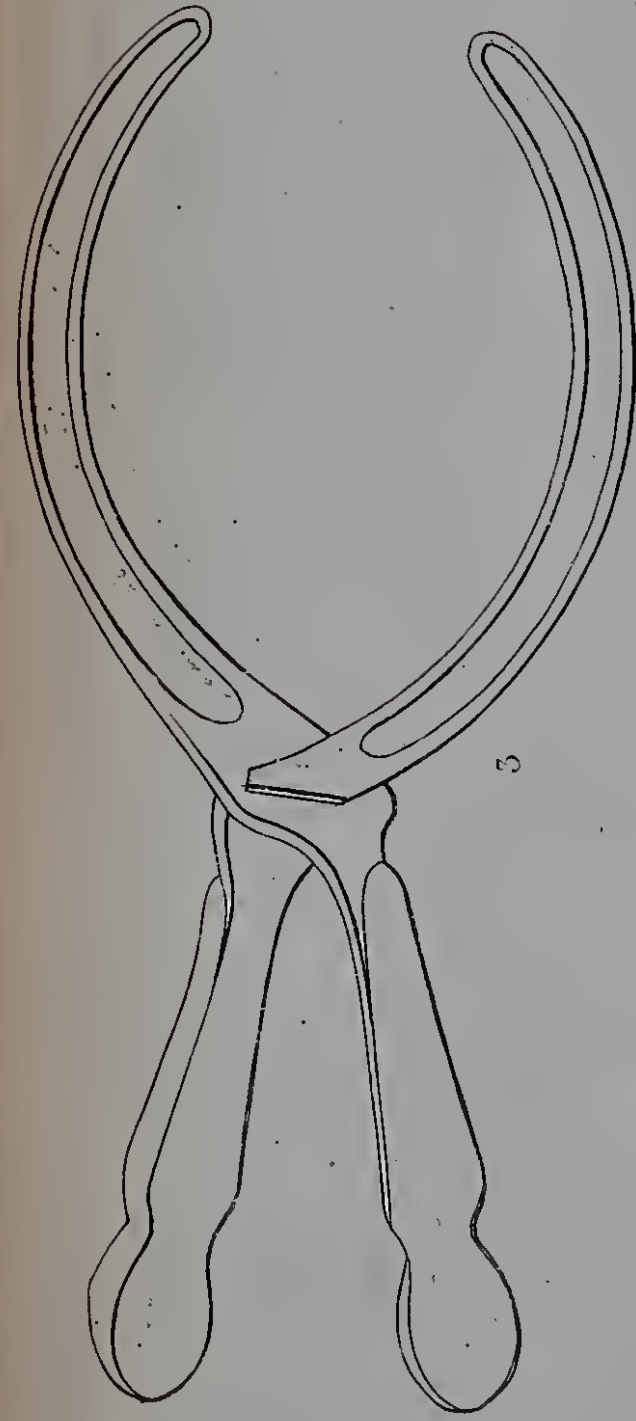
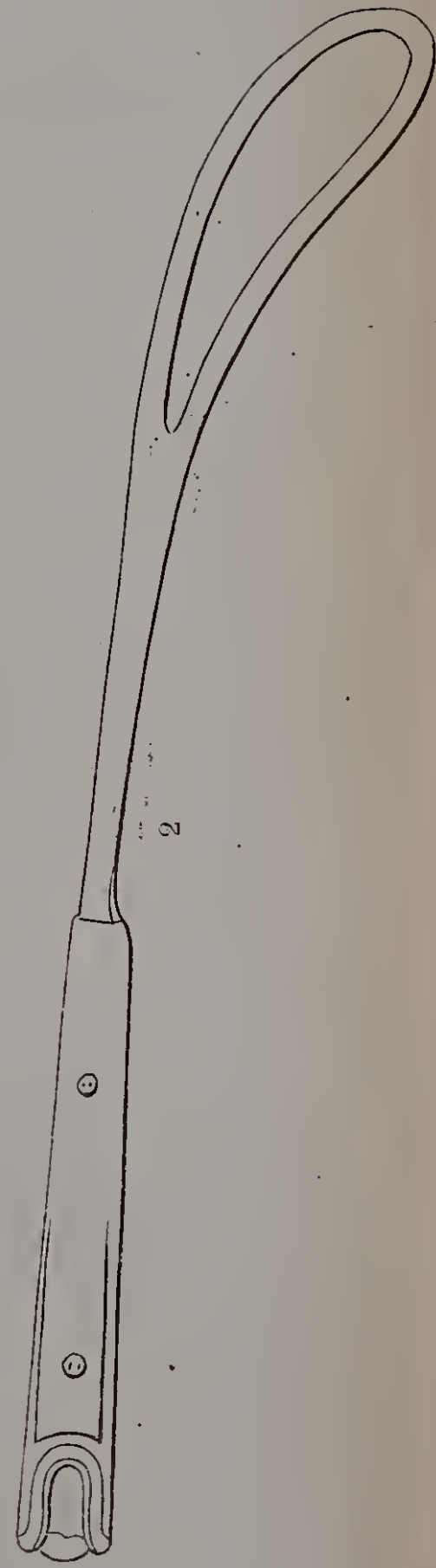
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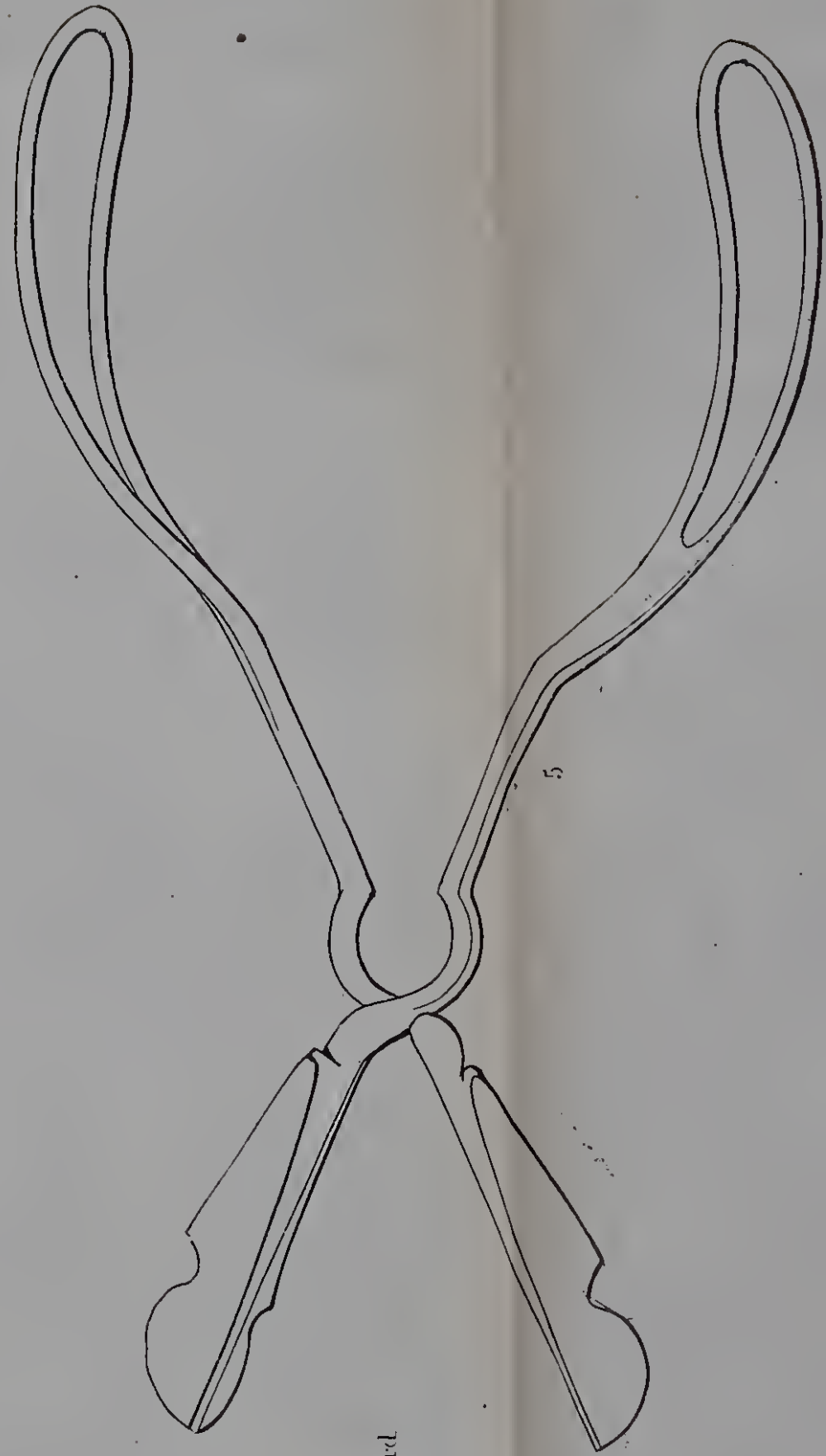
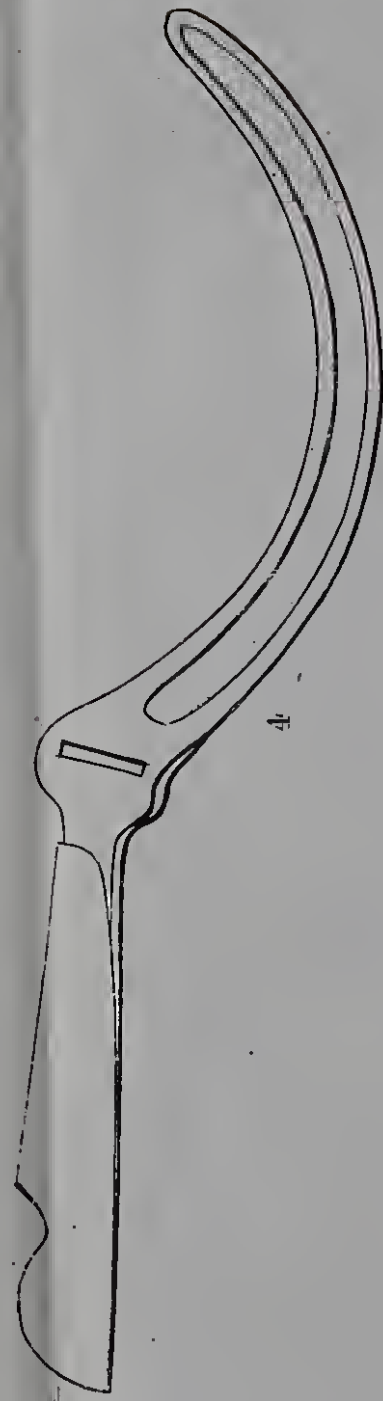




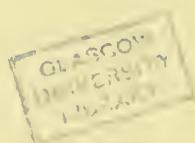
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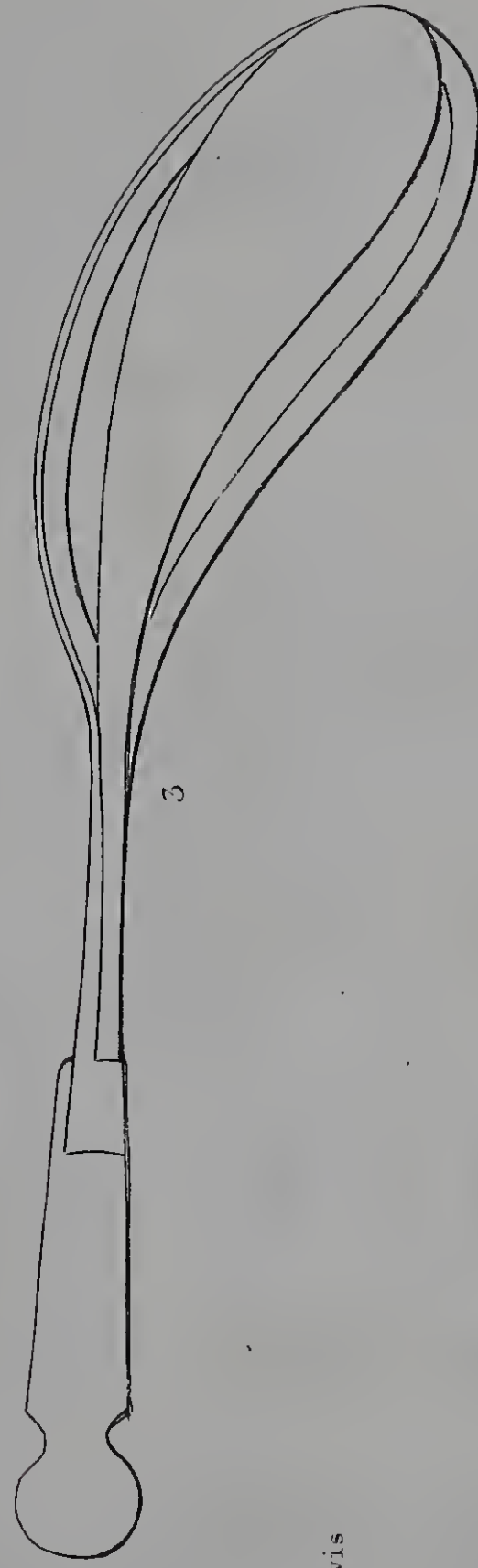
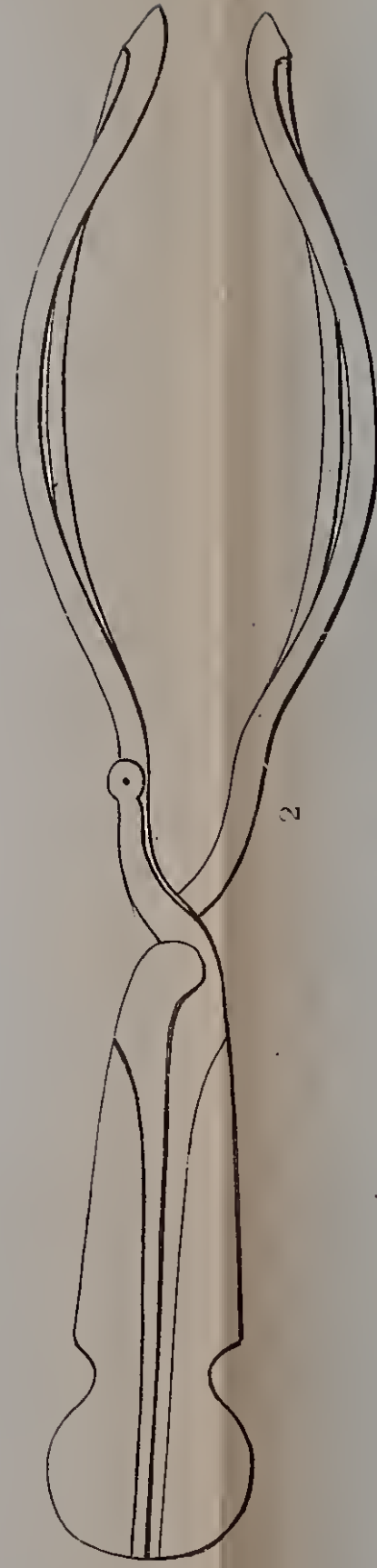
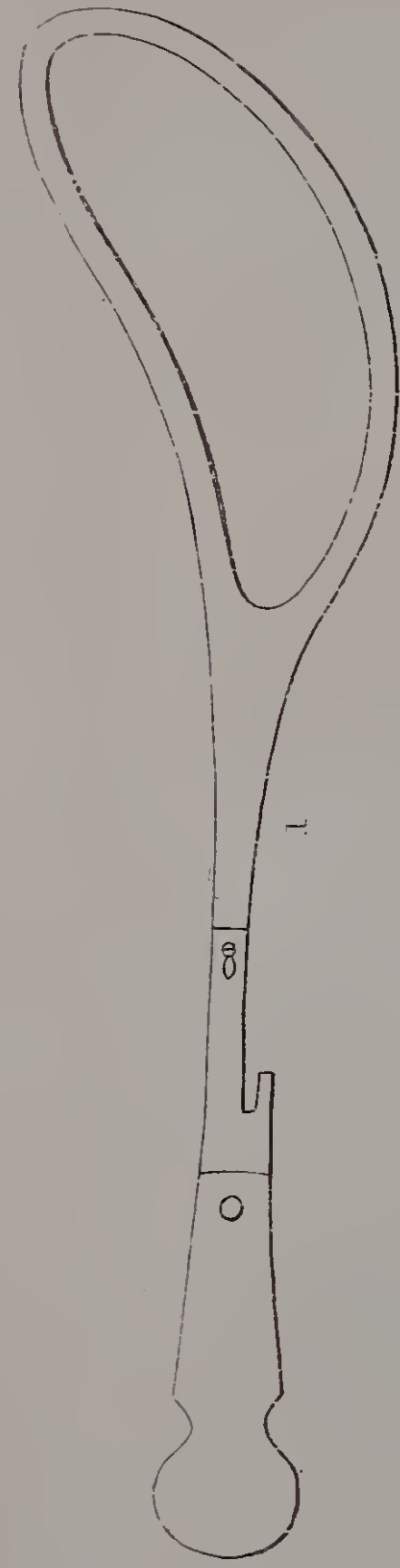


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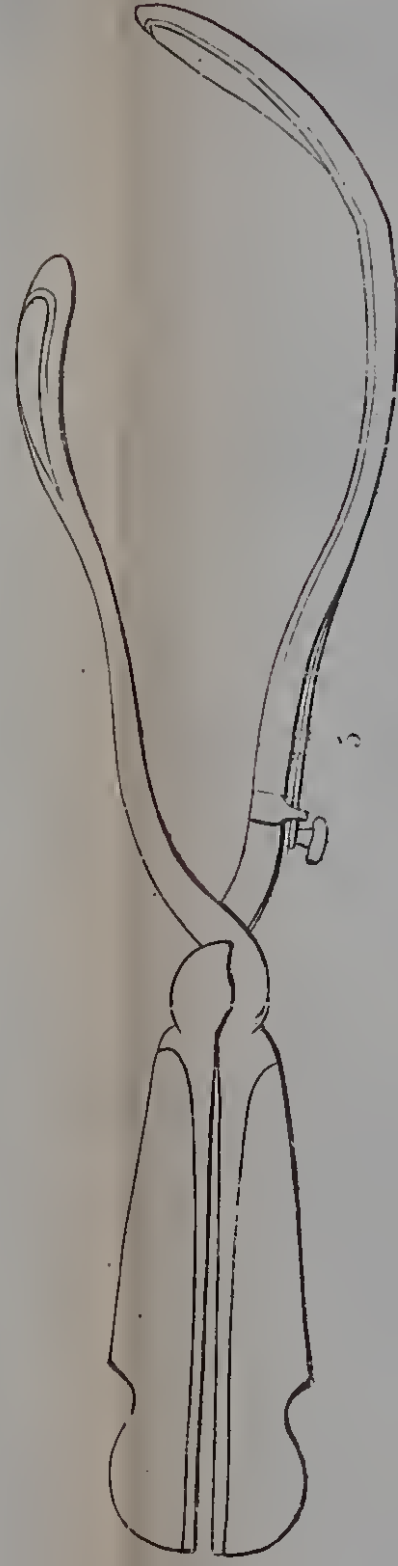
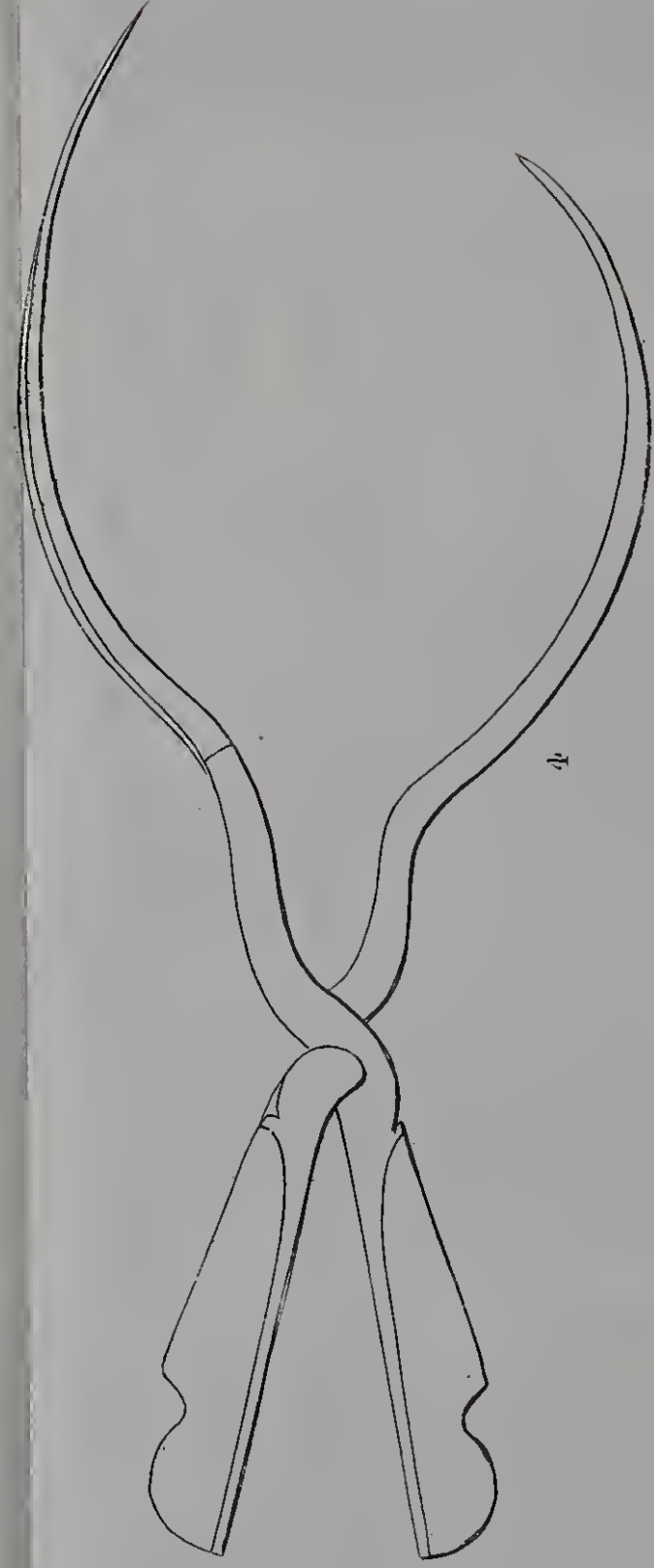


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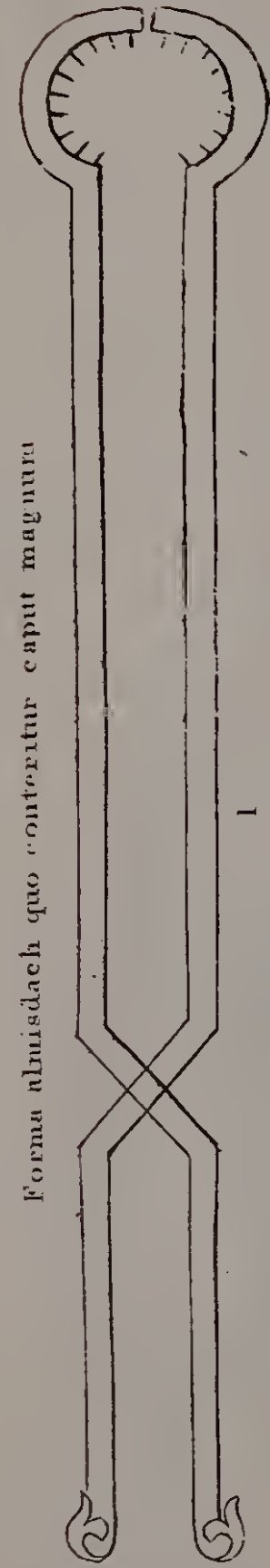




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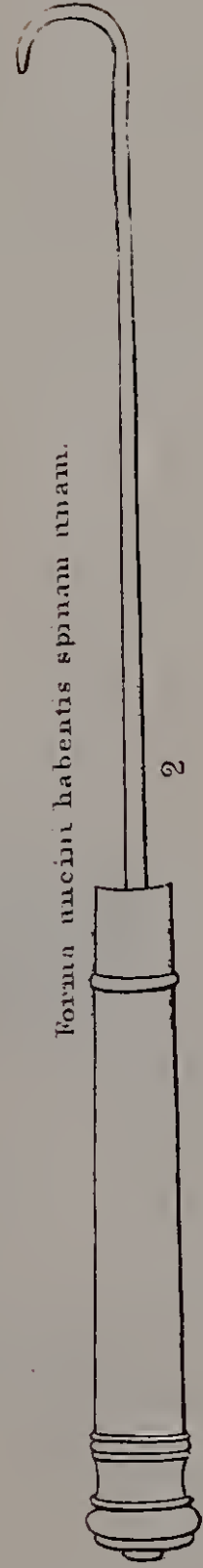


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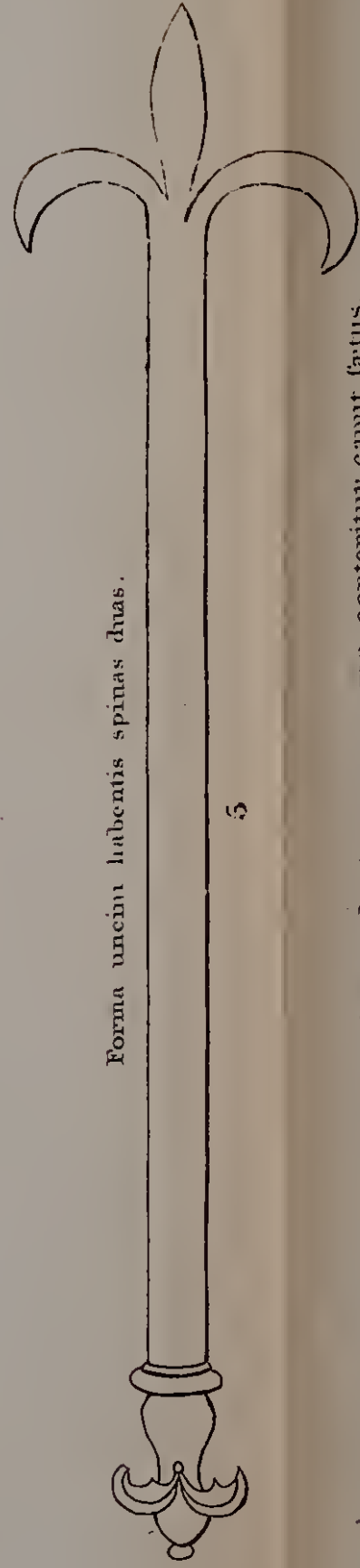
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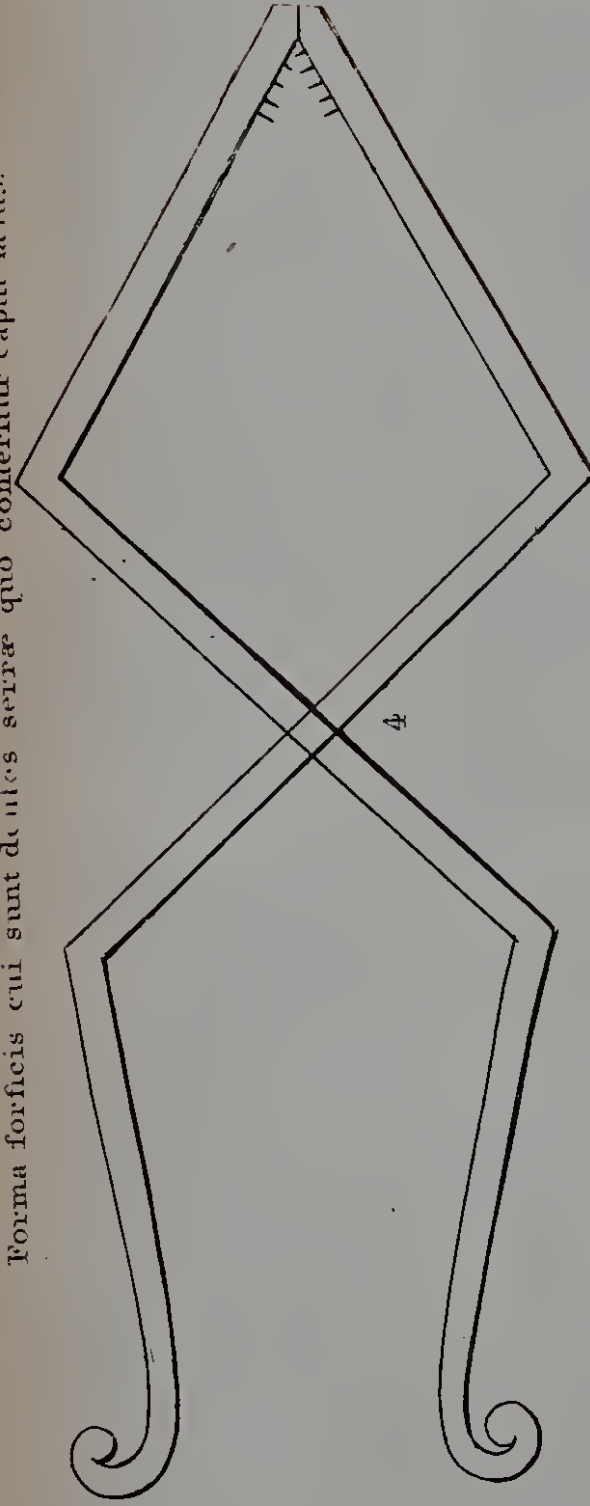
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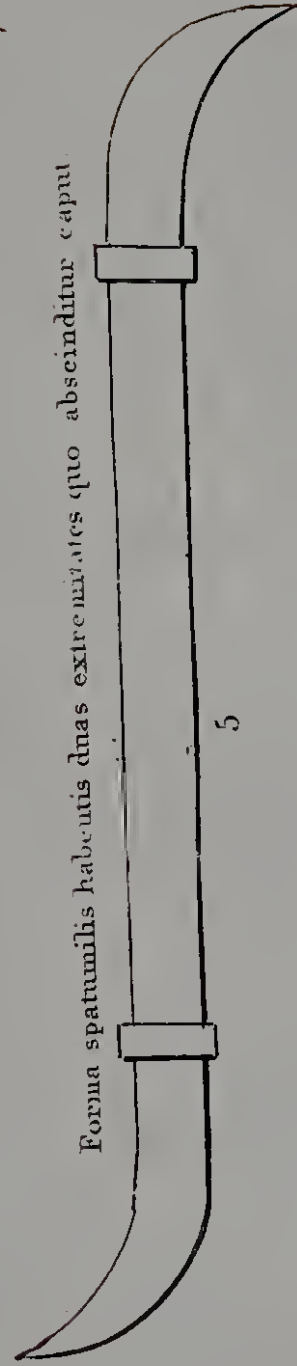
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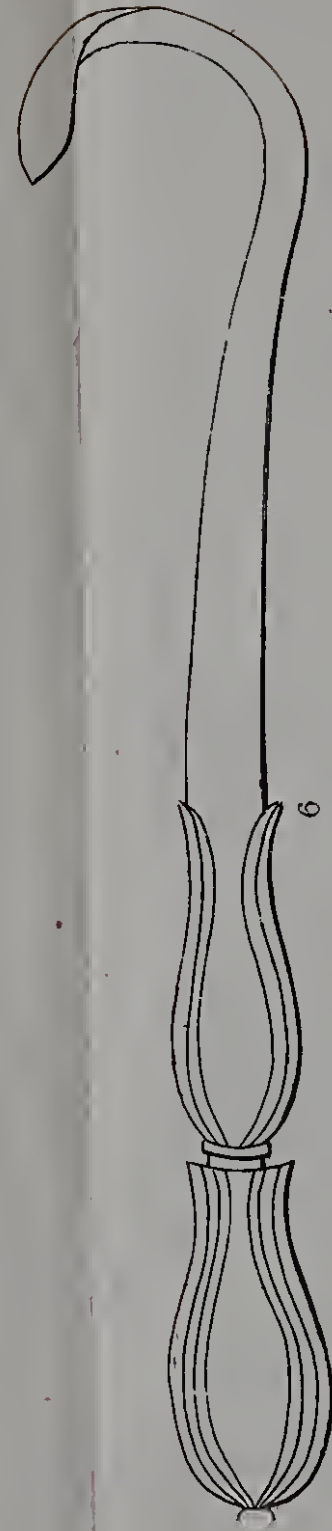


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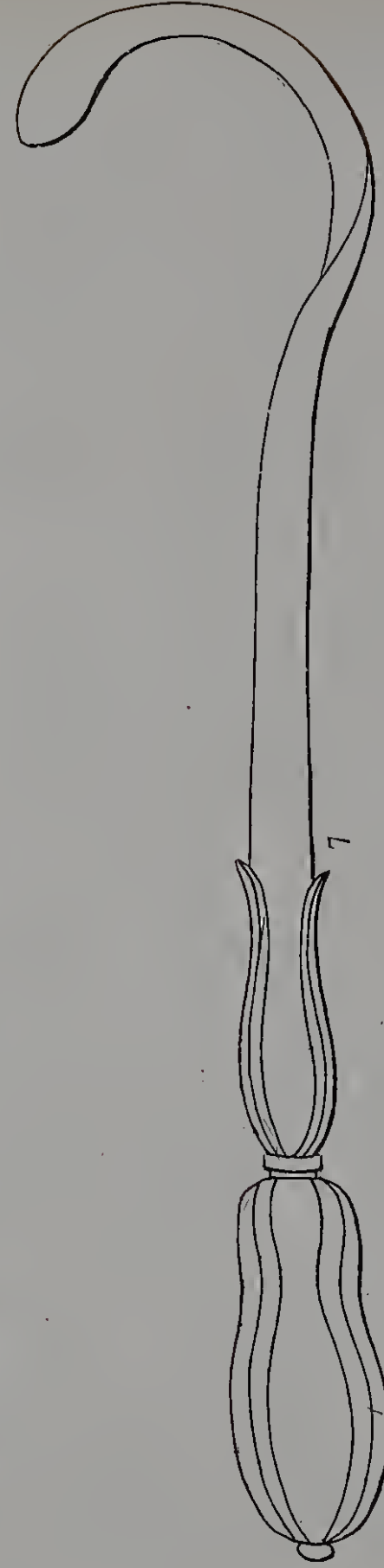
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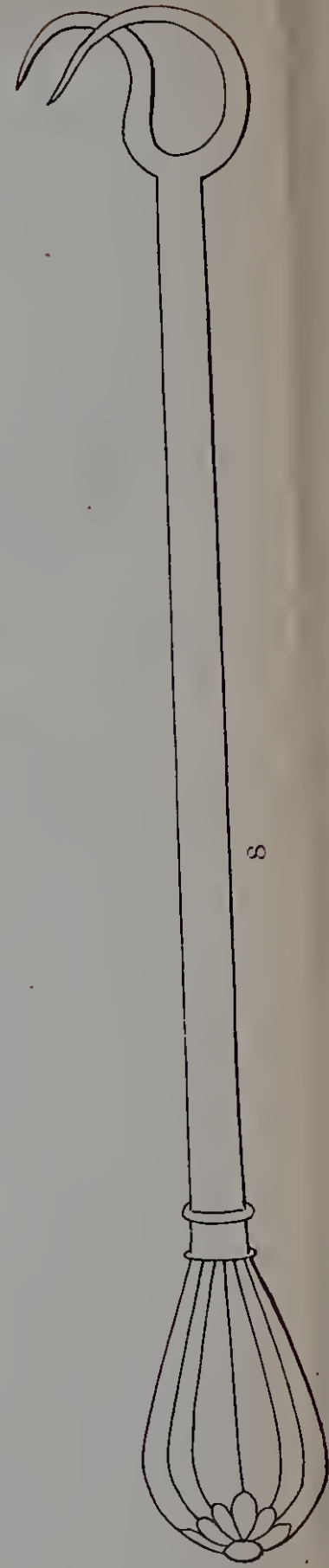


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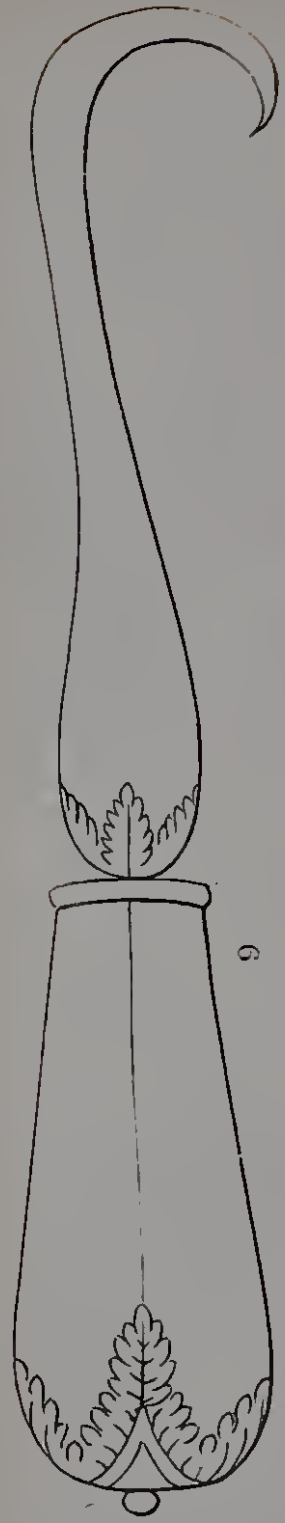


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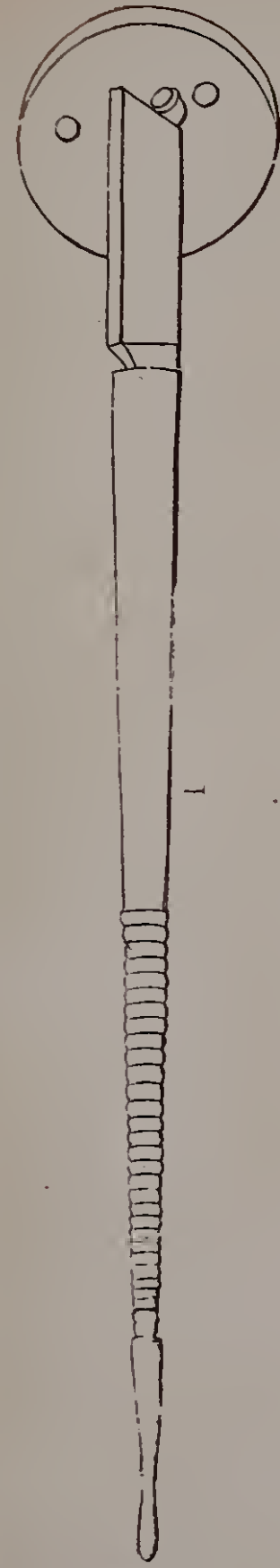


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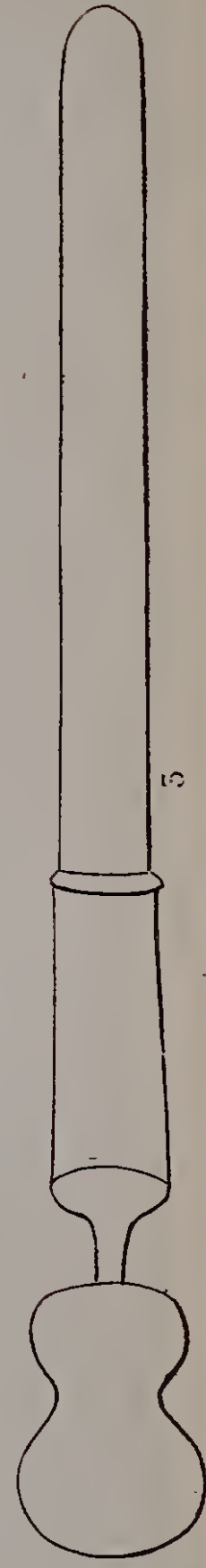
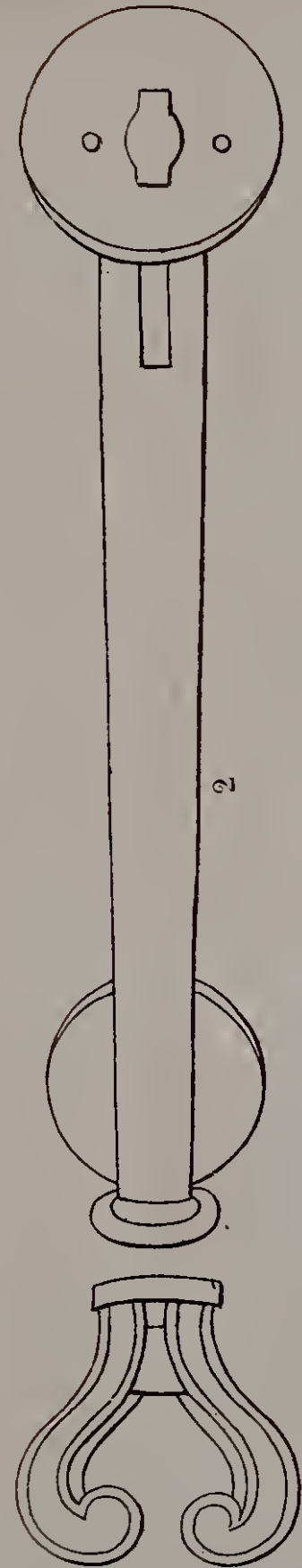


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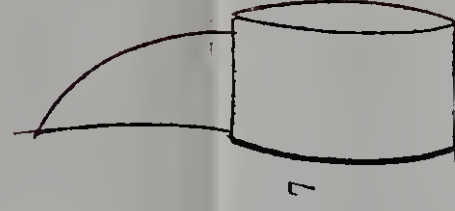
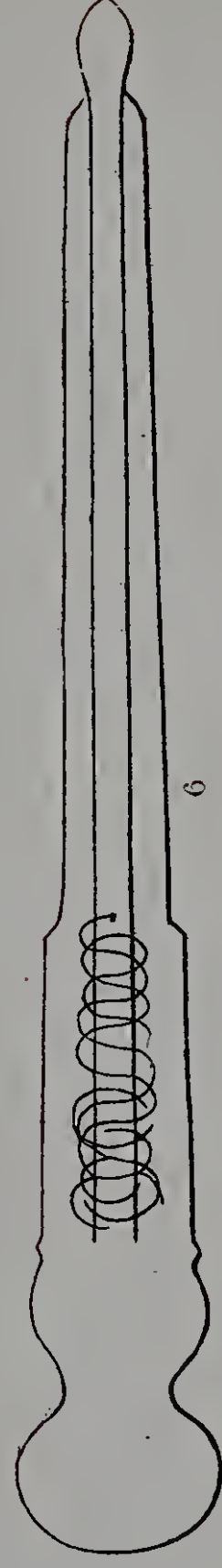




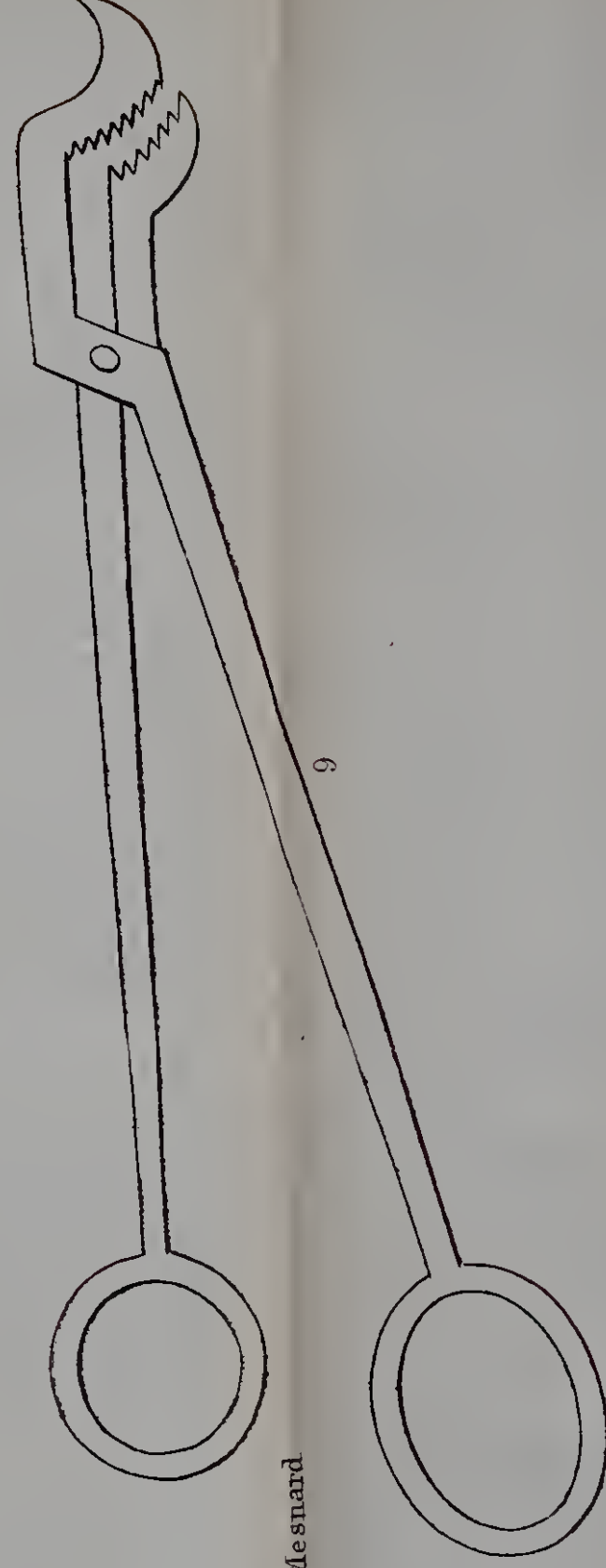
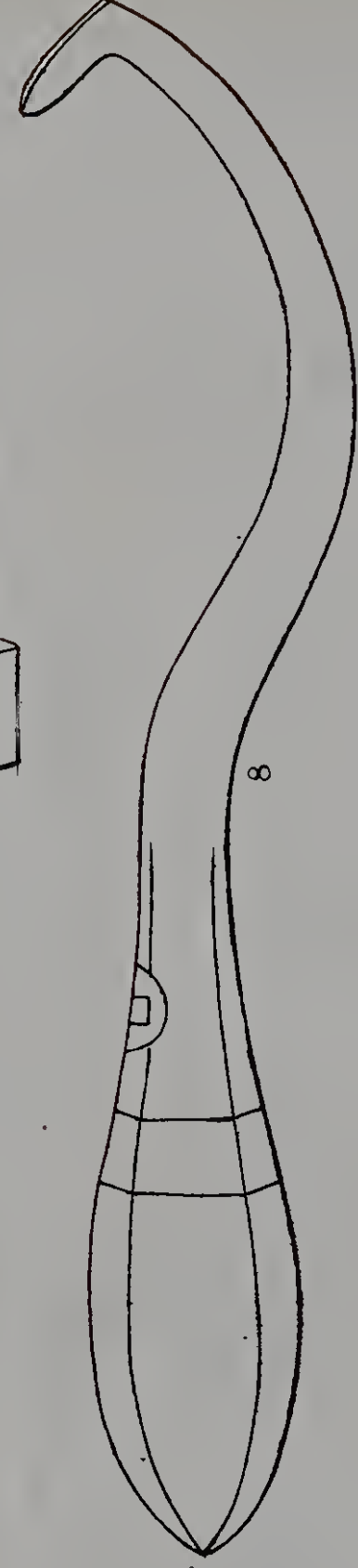
1. L. Mauriceau
(the left)



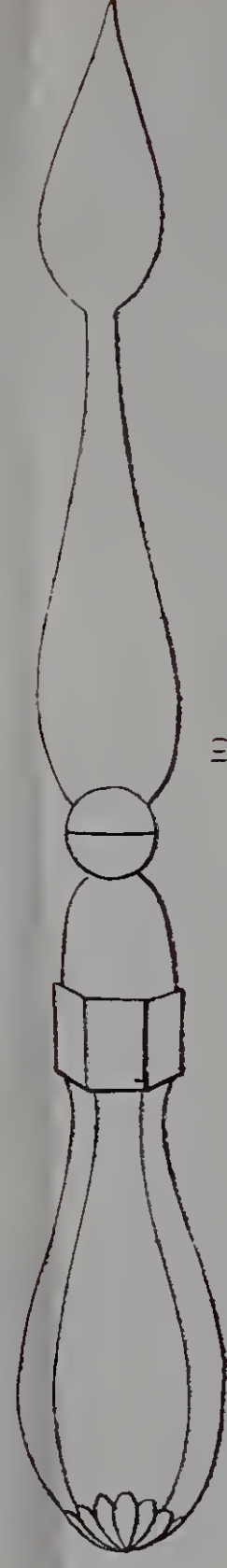
3, 4, 5, 6. Sir Fielding Ould
Terebra Occulta

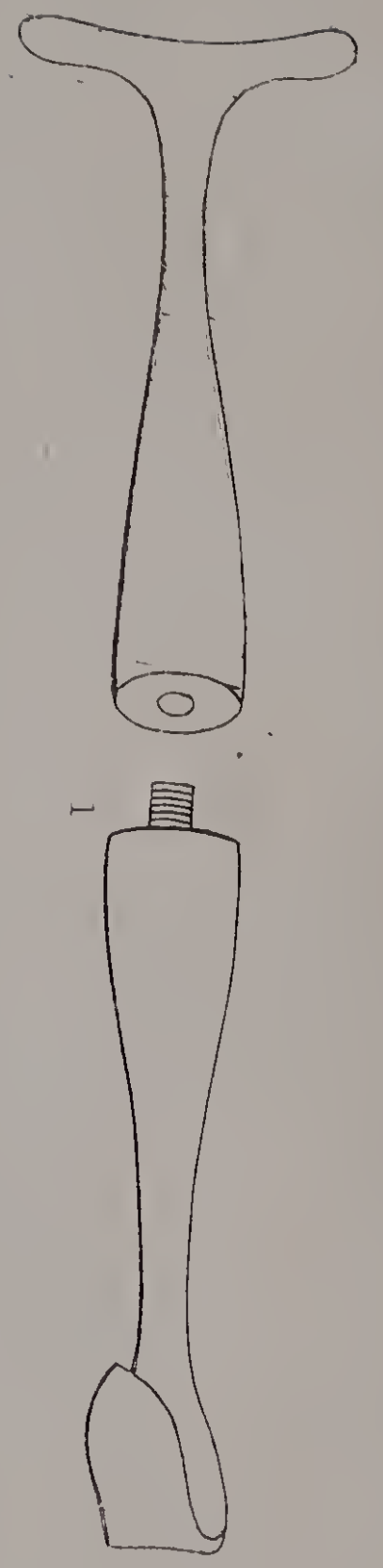


7. Sir H. Wilson
(Ring Scalpel)

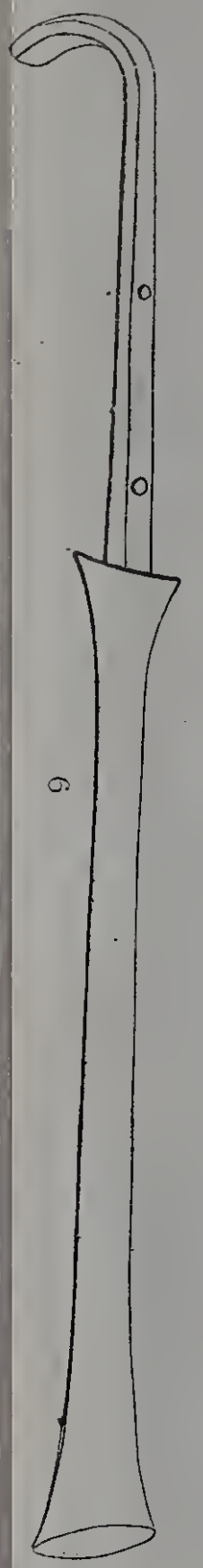
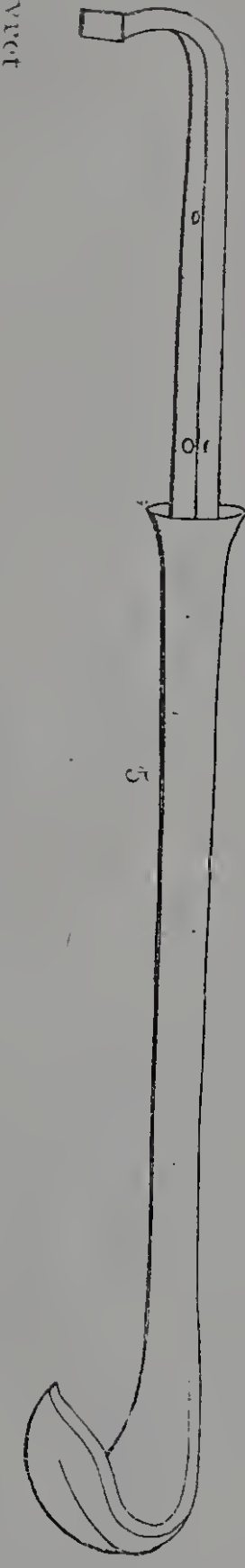
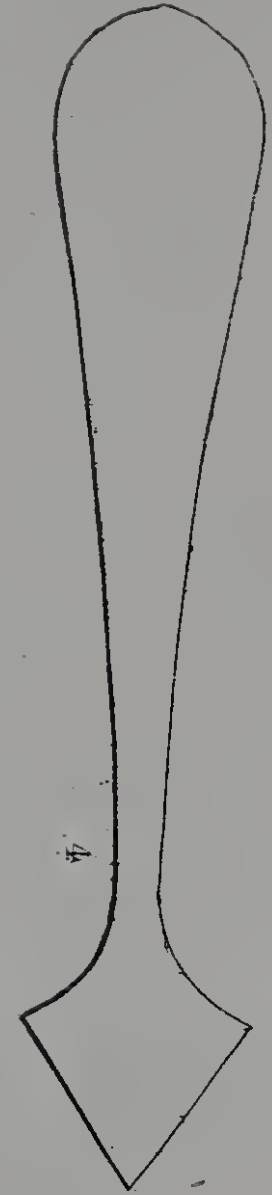
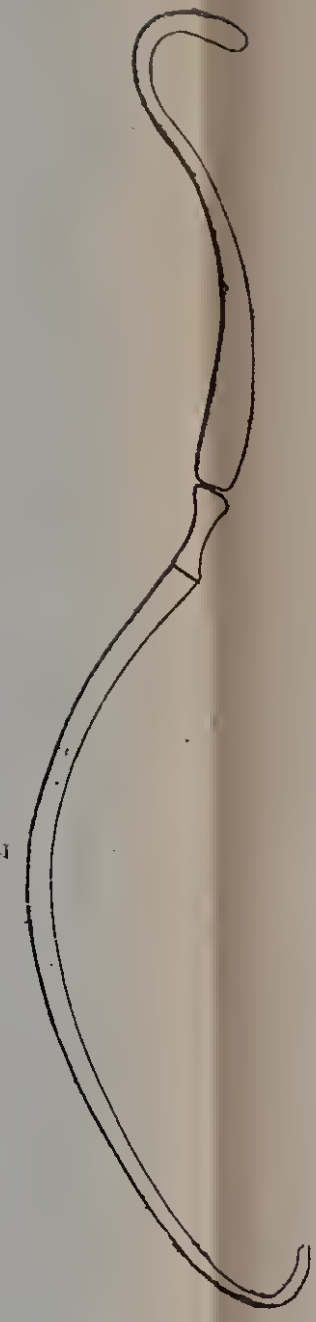


8, 9, 10. Mesnard

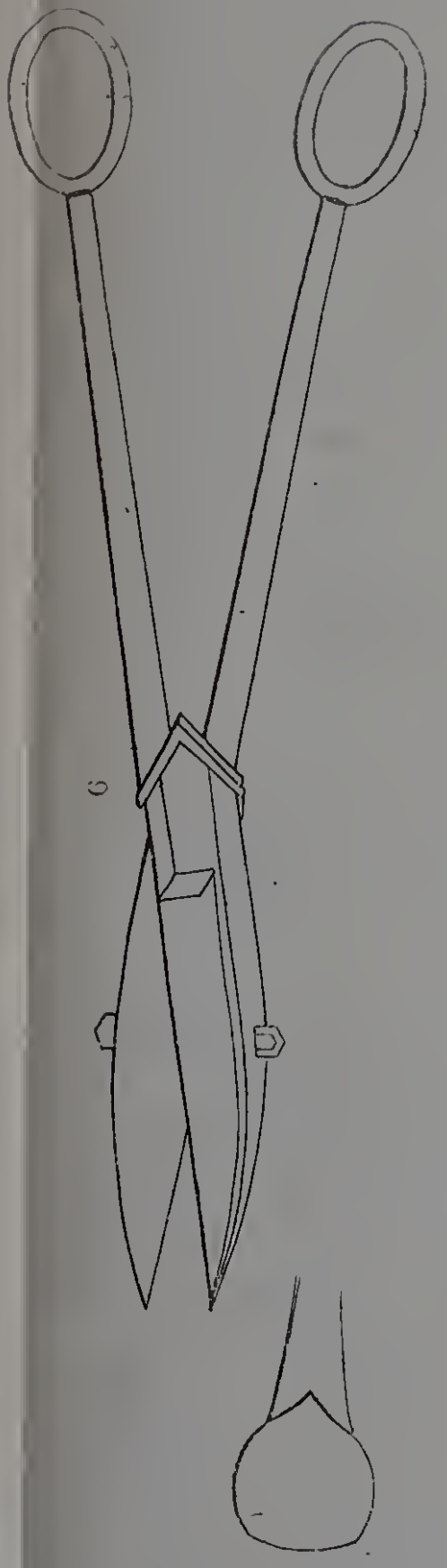
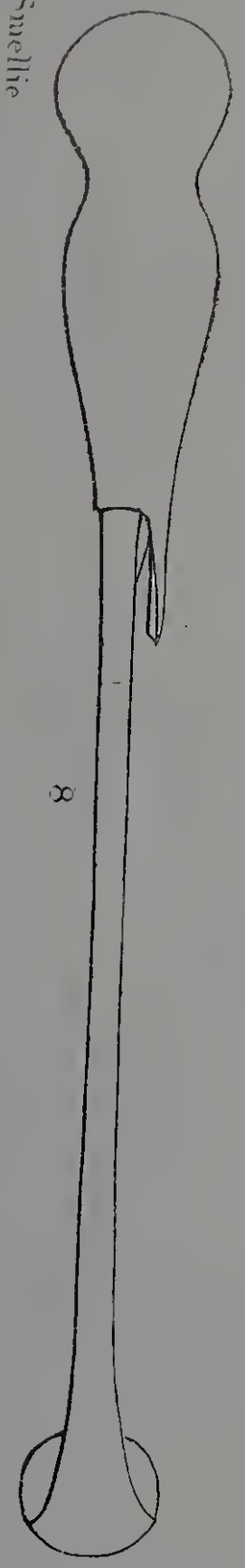
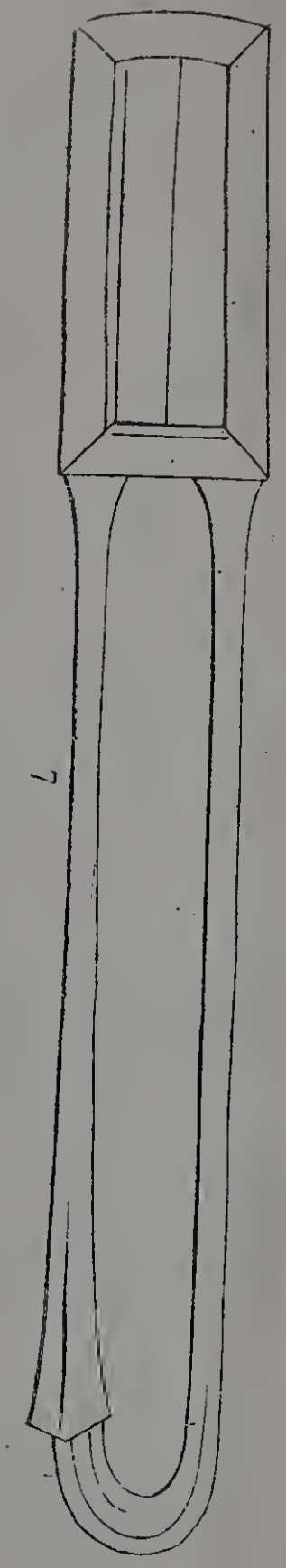




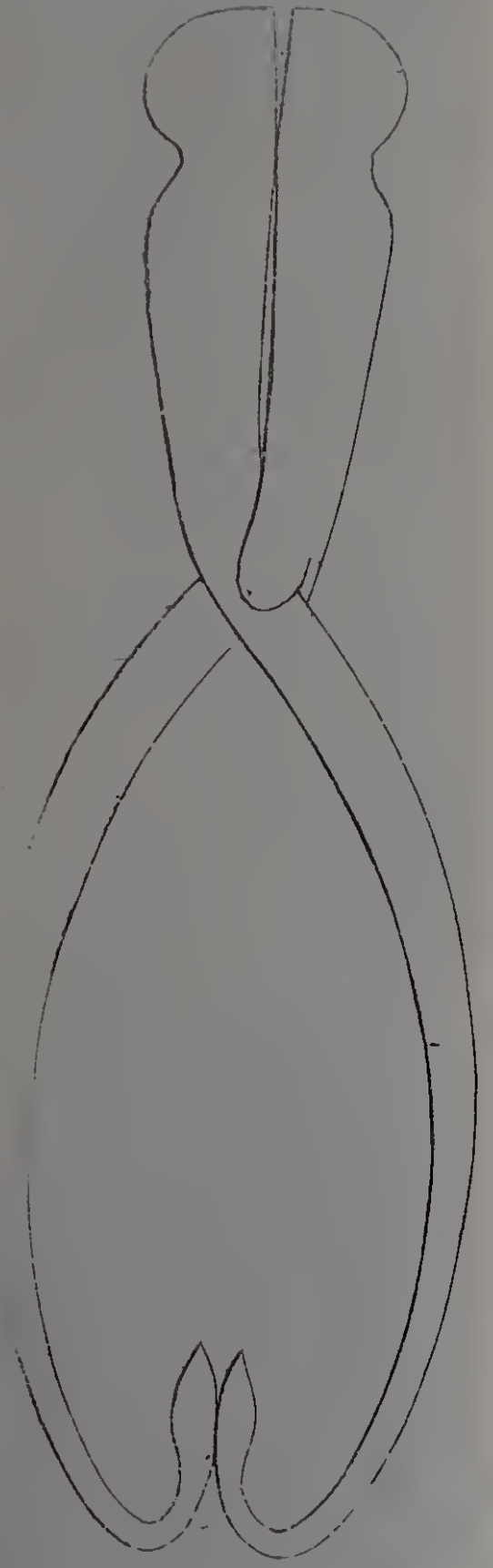
1, 2, 3, 4. Burton



5, 6, 7. Leveret

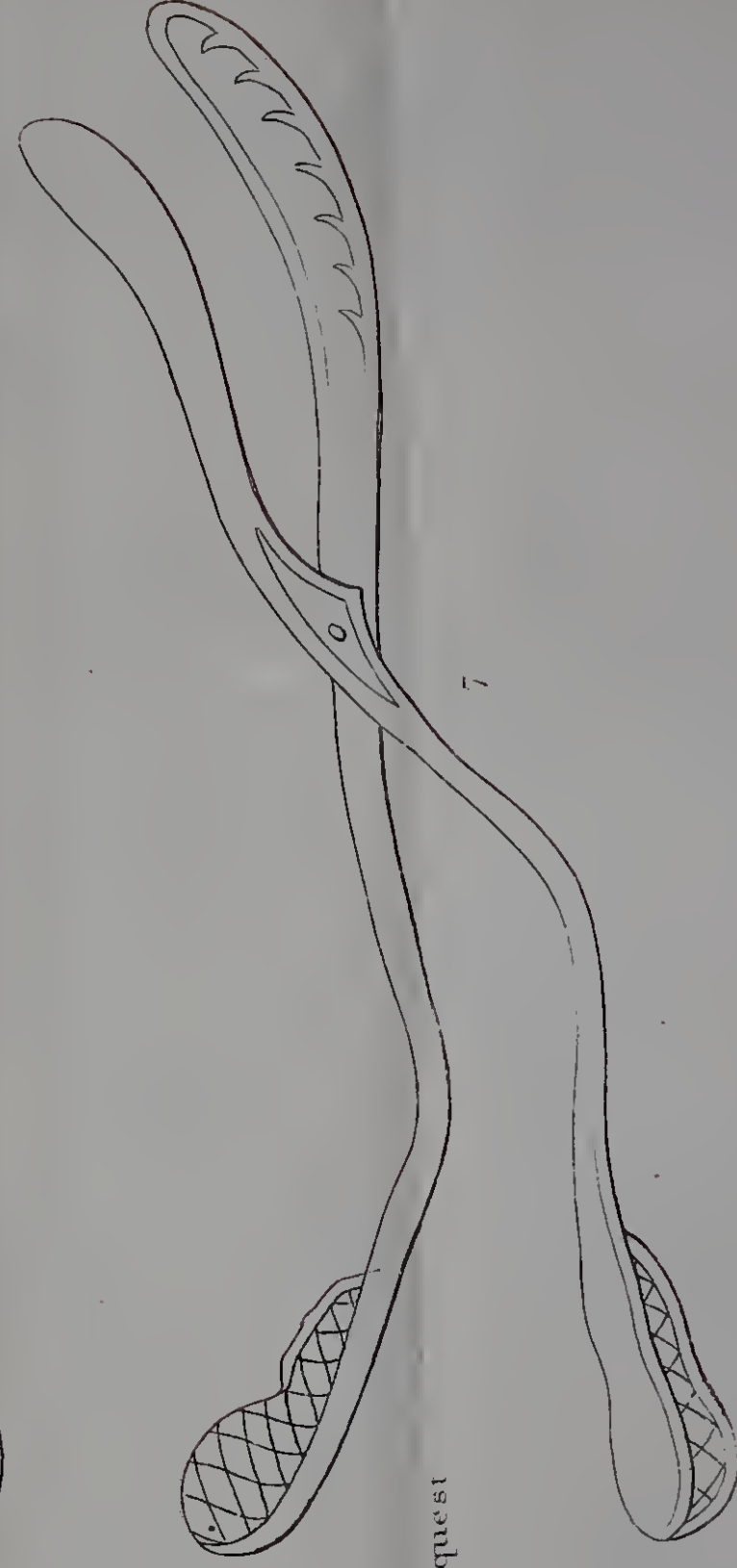
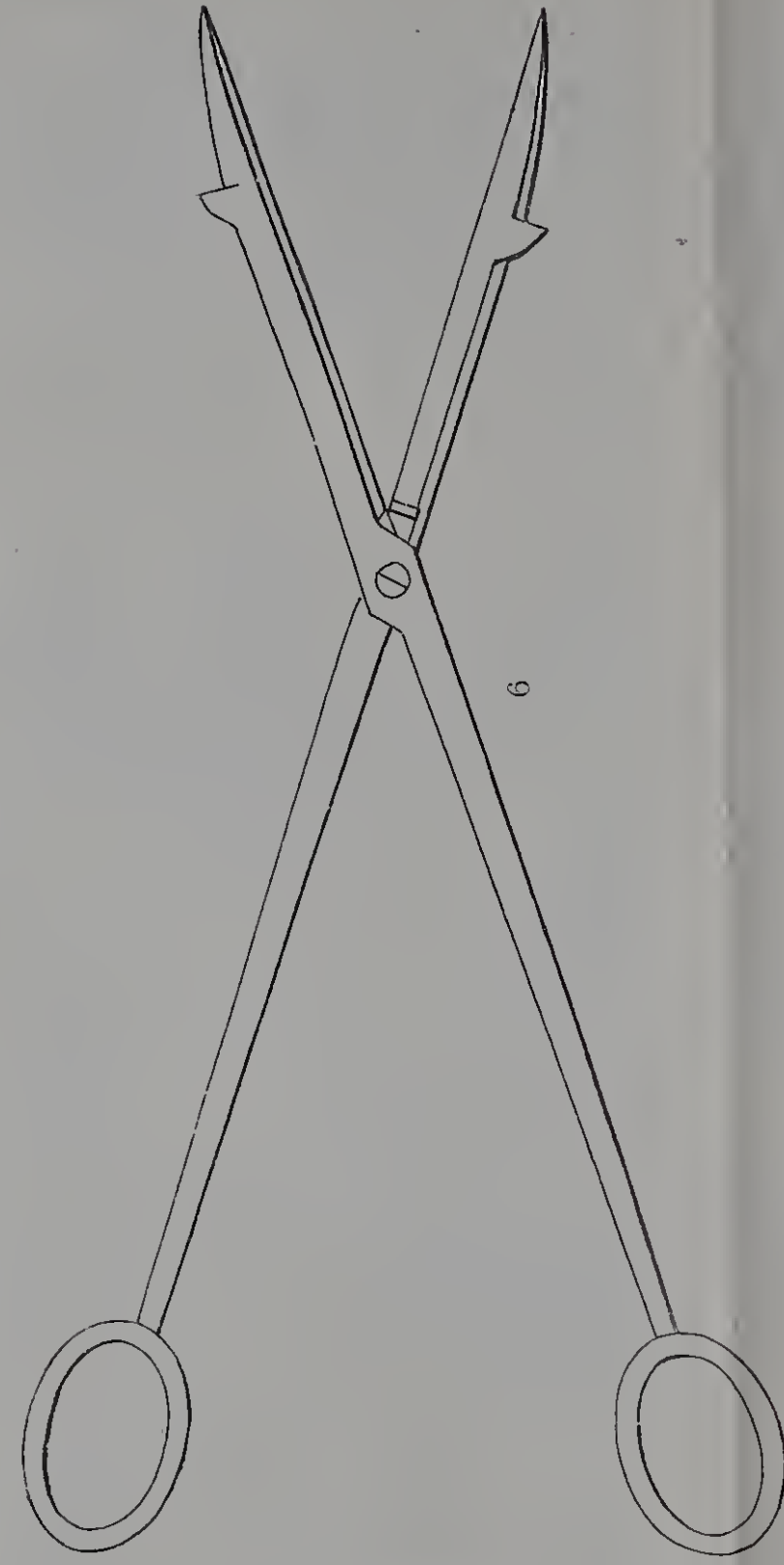
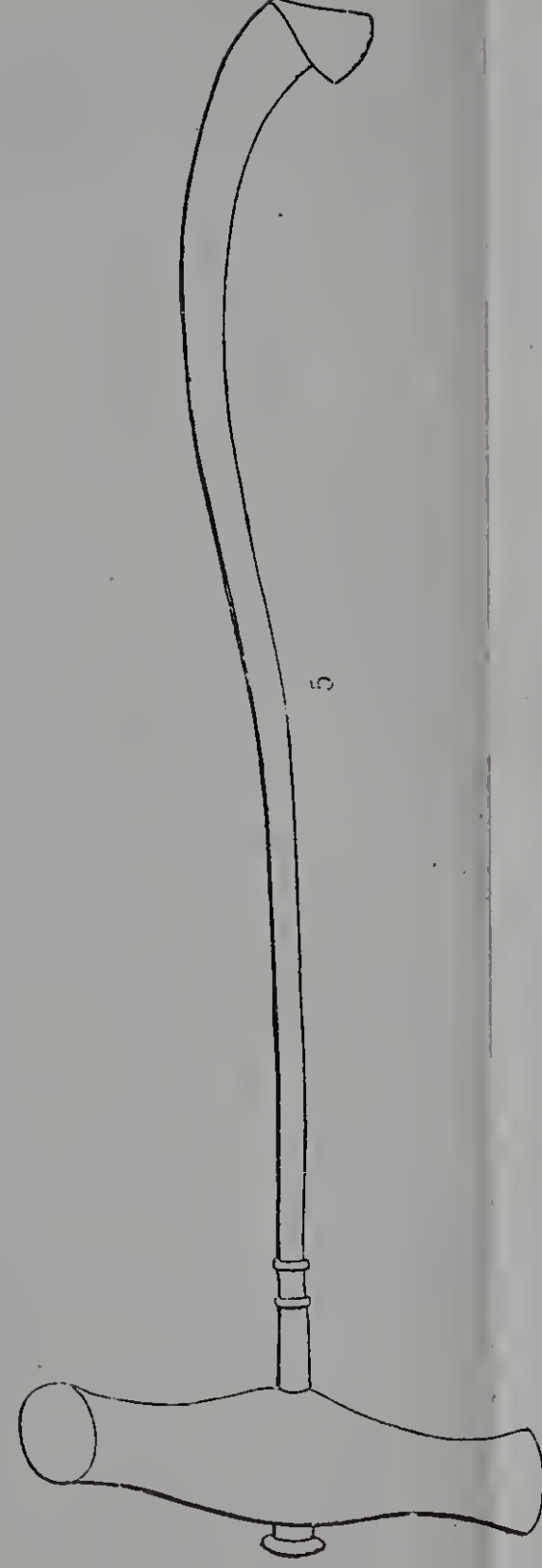
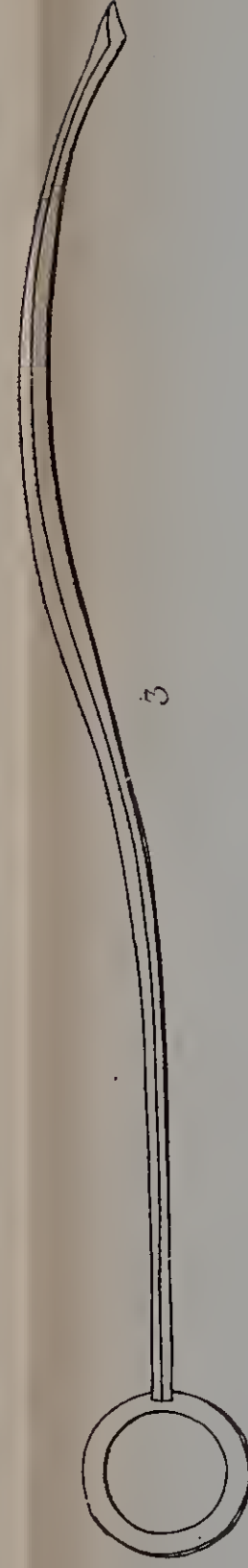
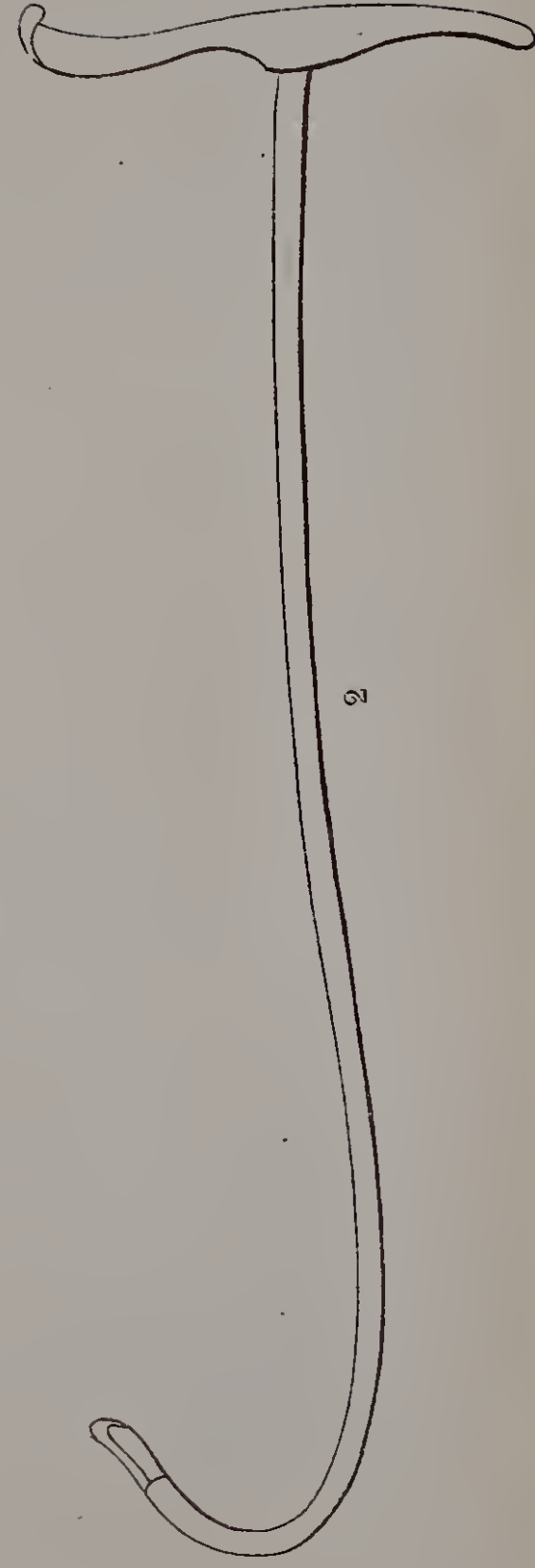


8, 9, 10. Snelhe



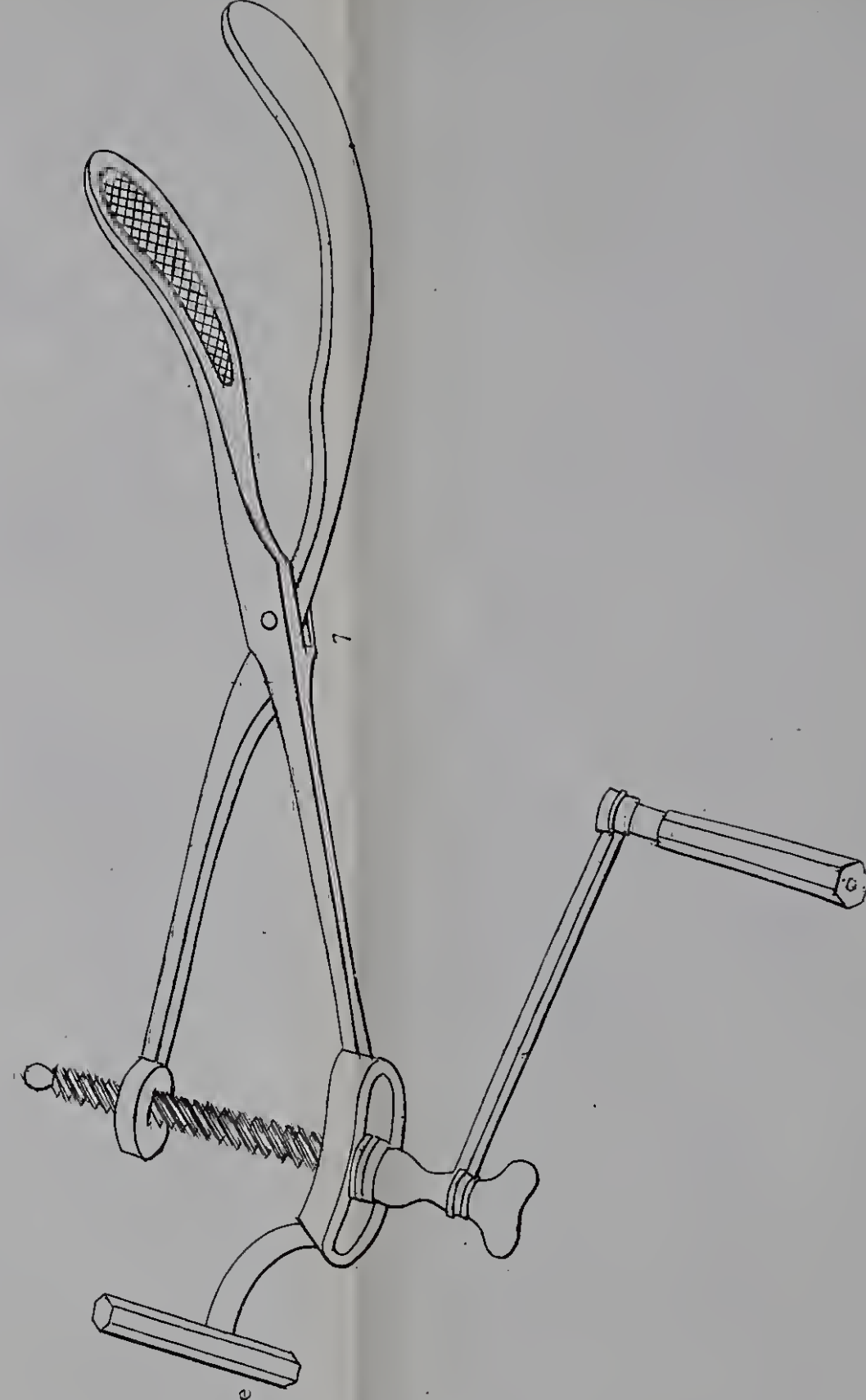
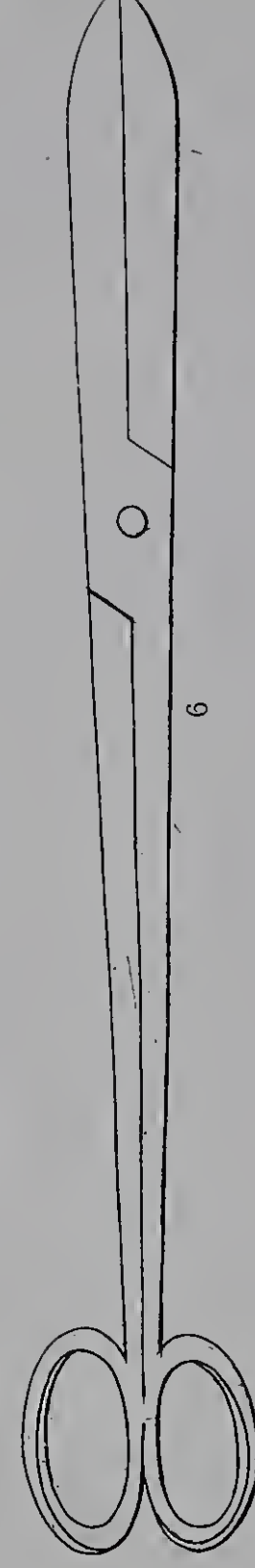
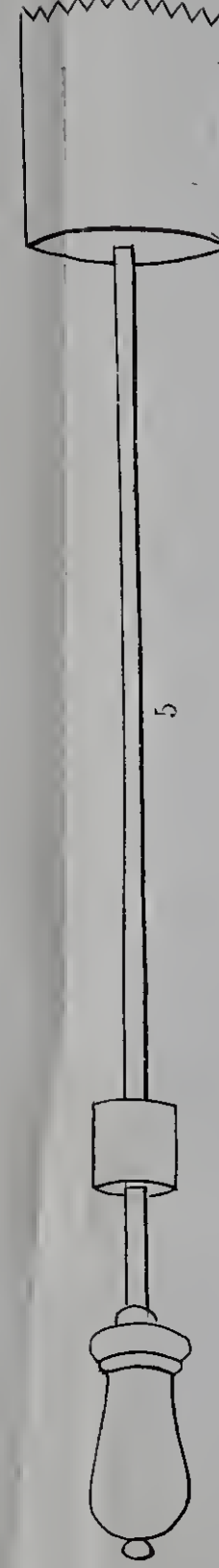
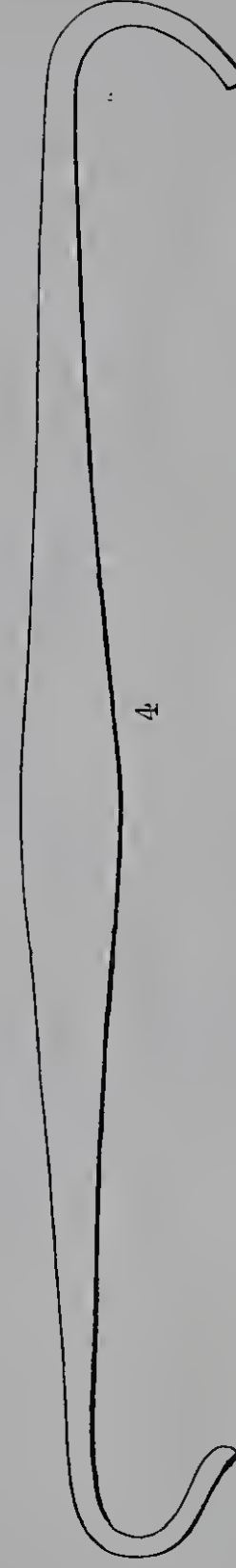
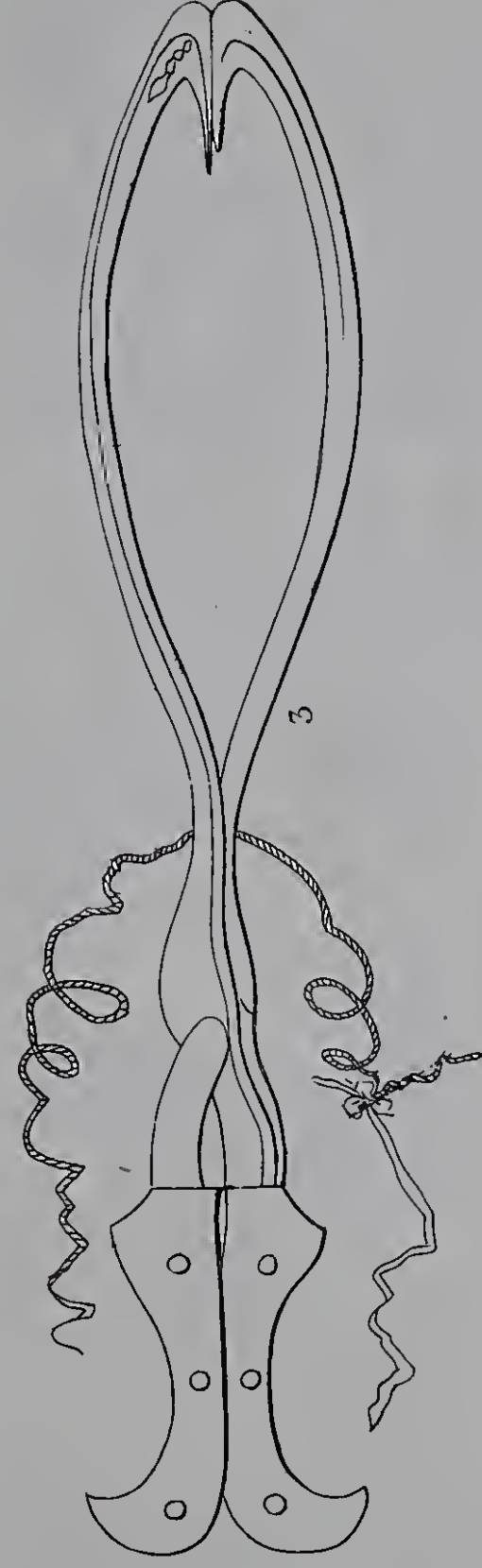
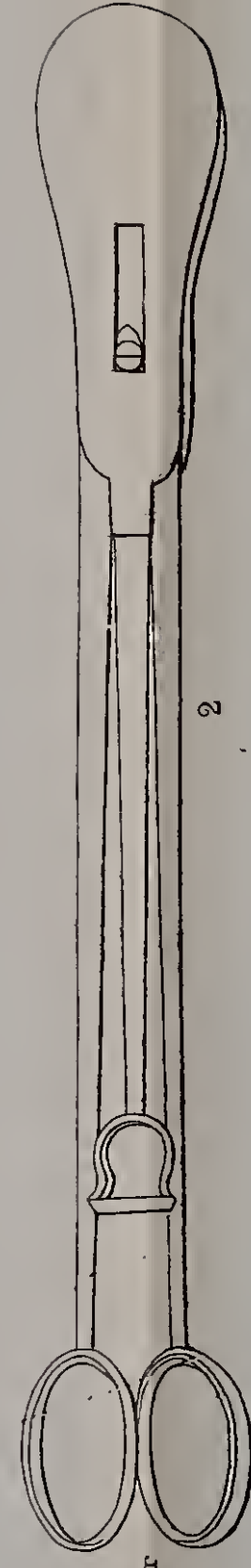
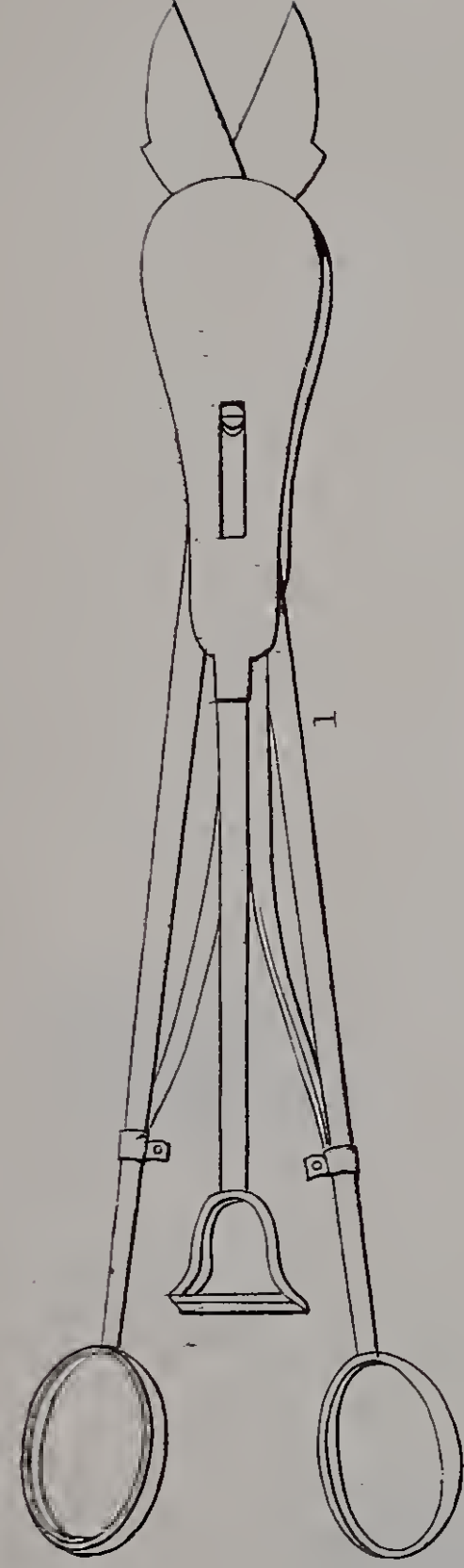


1. Antken



7. Conquest

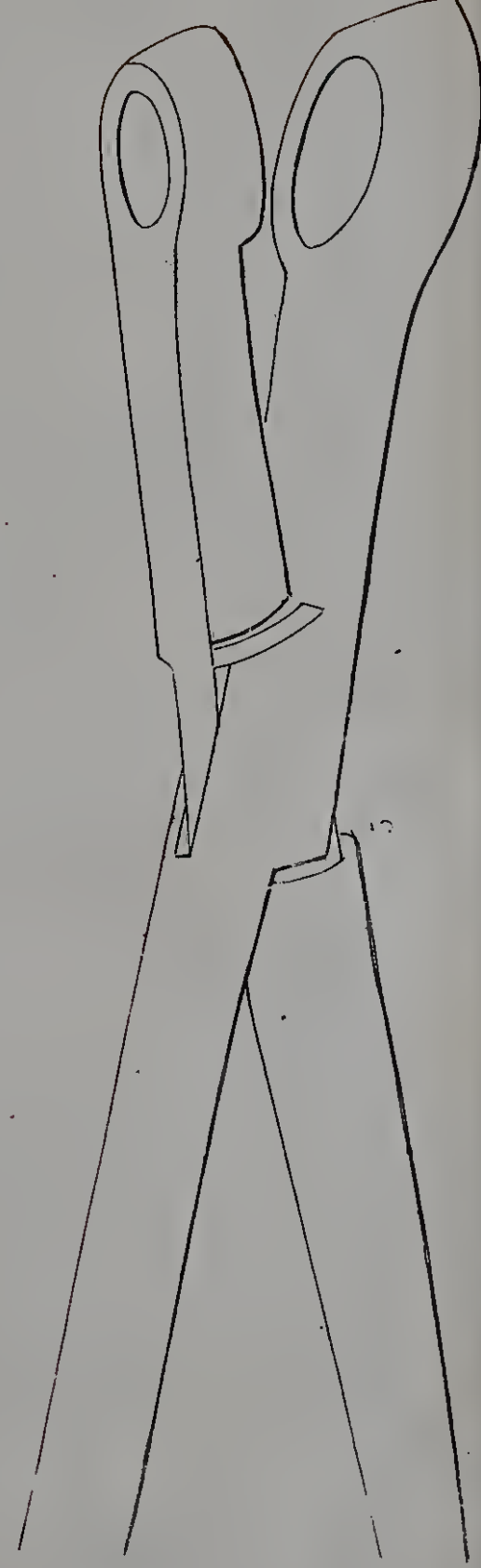
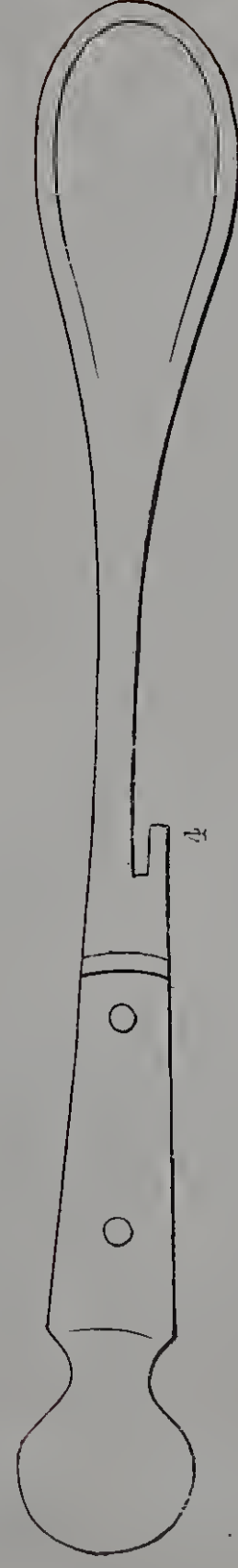
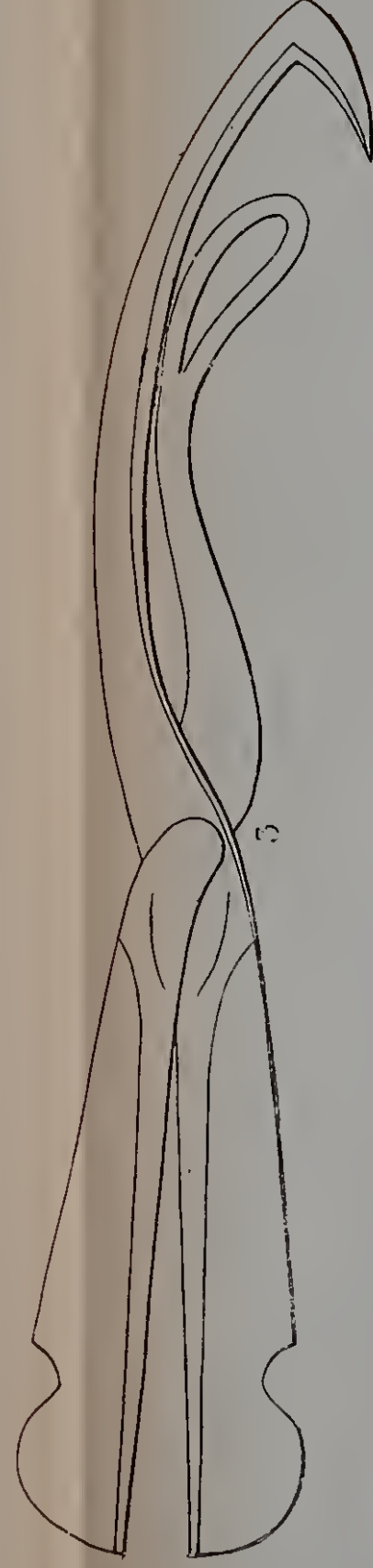
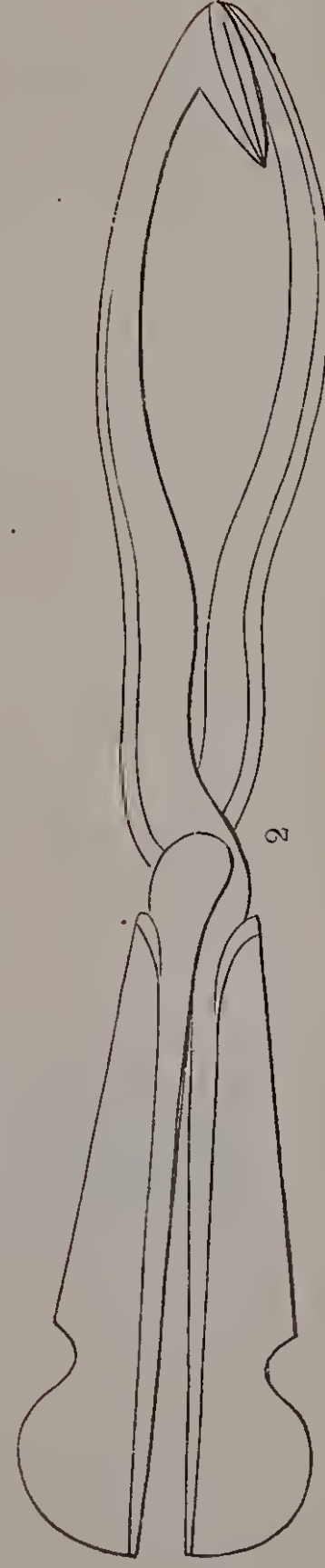
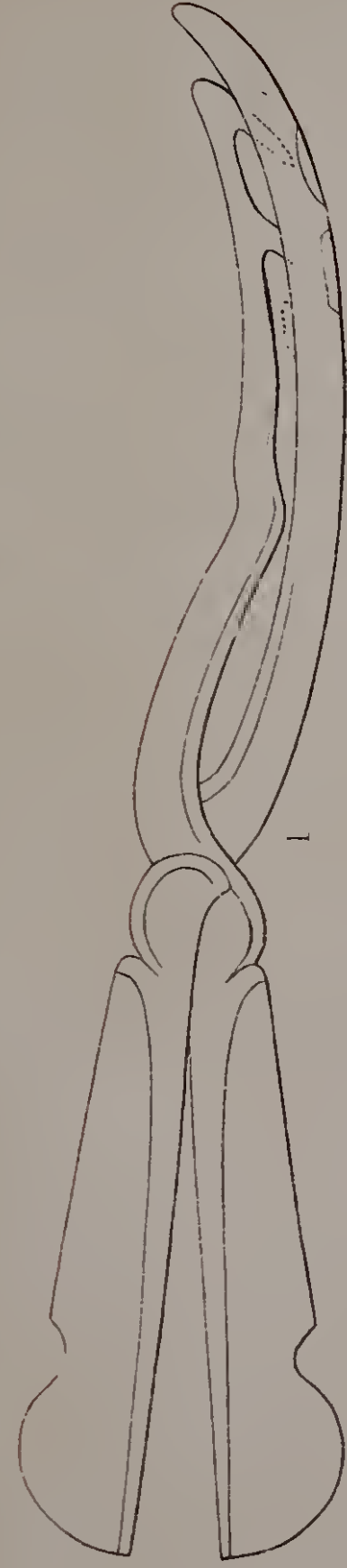
2, 3, 4, Johnson



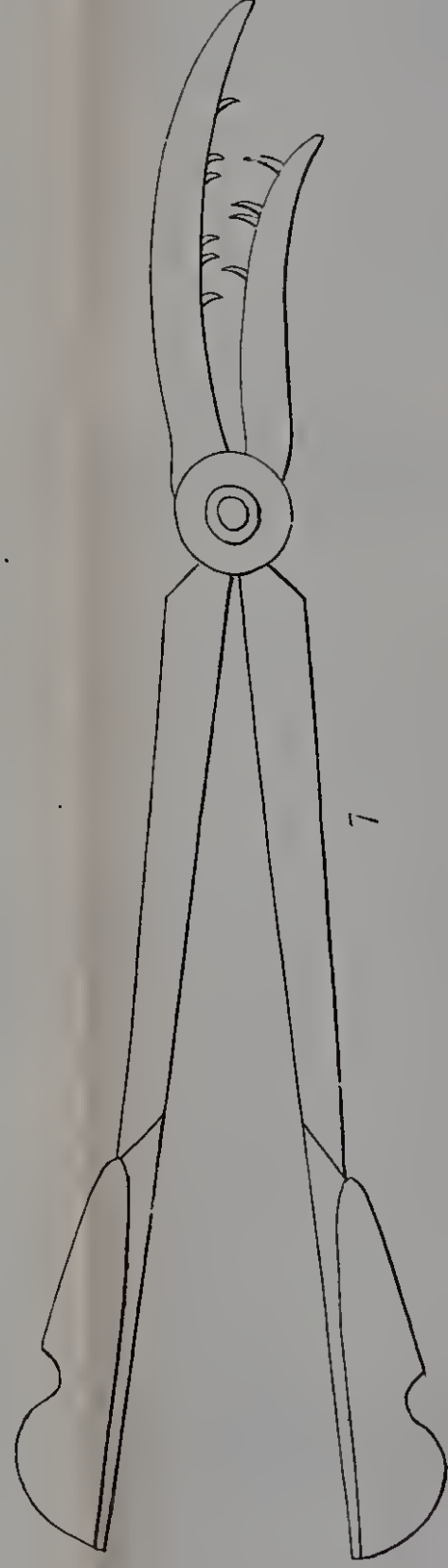
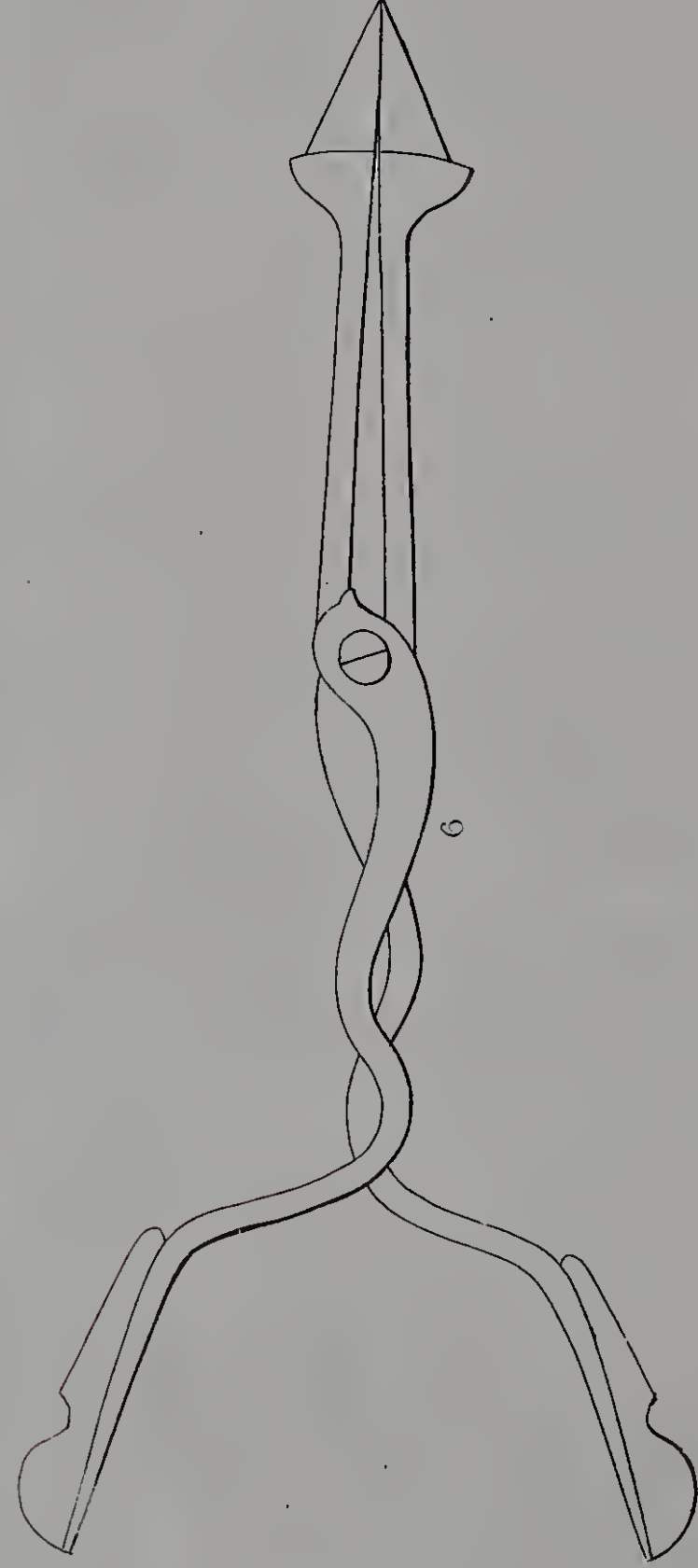
1. 2. 3. Osiander

4. 5. 6. Joerg

7. Banelocque



12.5.4.5. Davis



6.7.11.13

~~Grief~~ step.

